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Occupational HAZARDS

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THERE'S PROFIT IN PREVENTION

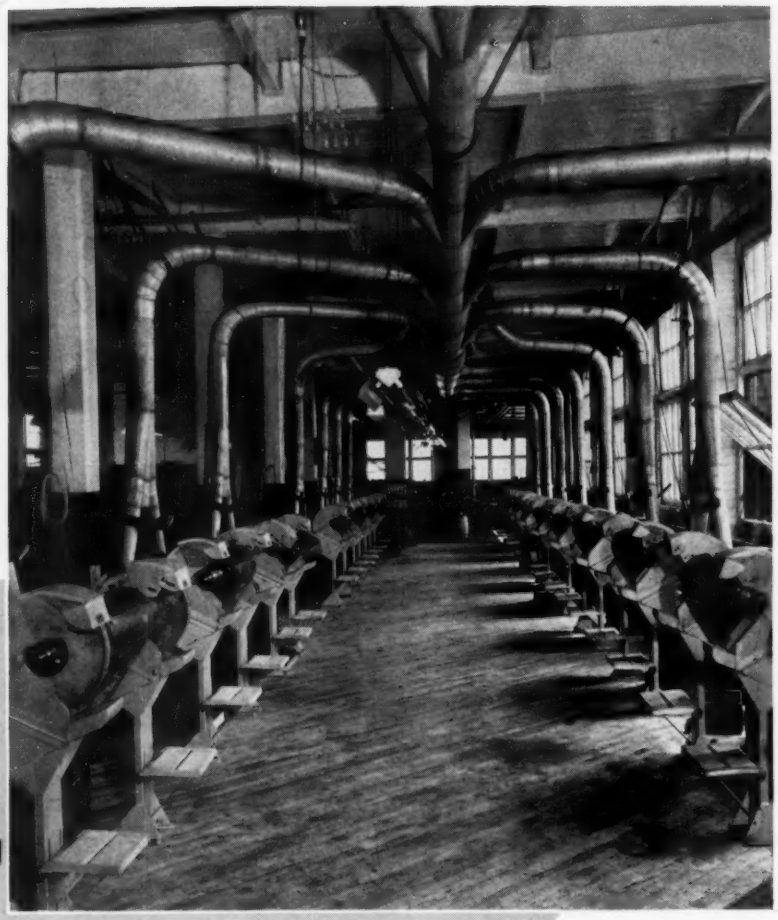
EBRUARY
1947

ROUTE TO —
YOUR PLANT
E PROTECTION
EN: FEATURE
SECTION ON
E PROTECTION
OR INDUSTRY

IN THIS ISSUE:

INDUSTRIAL VISION . . . POWER PRESS TIPS
. . . MINOR BURN TREATMENT . . . DUST CONTROL
LESSONS . . . "BEAN SOUP" FOR INDUSTRIAL FIRES

● *The type of machines used, the kind of dust produced, the plant layout . . . all are important considerations in planning an efficient, correctly engineered dust control system.*



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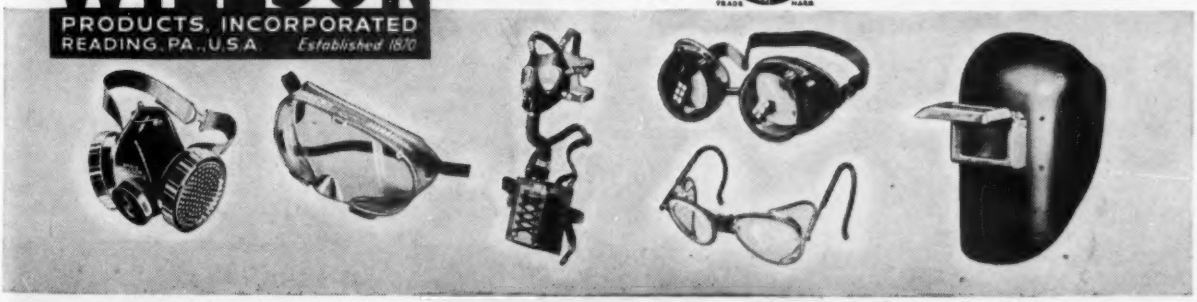

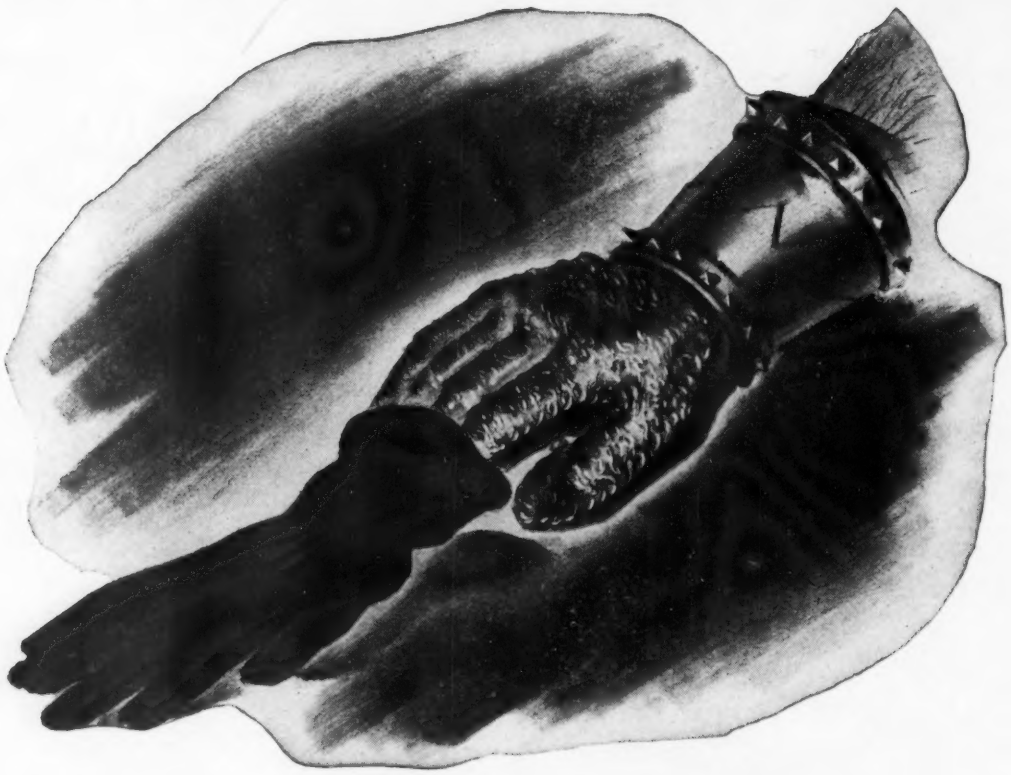

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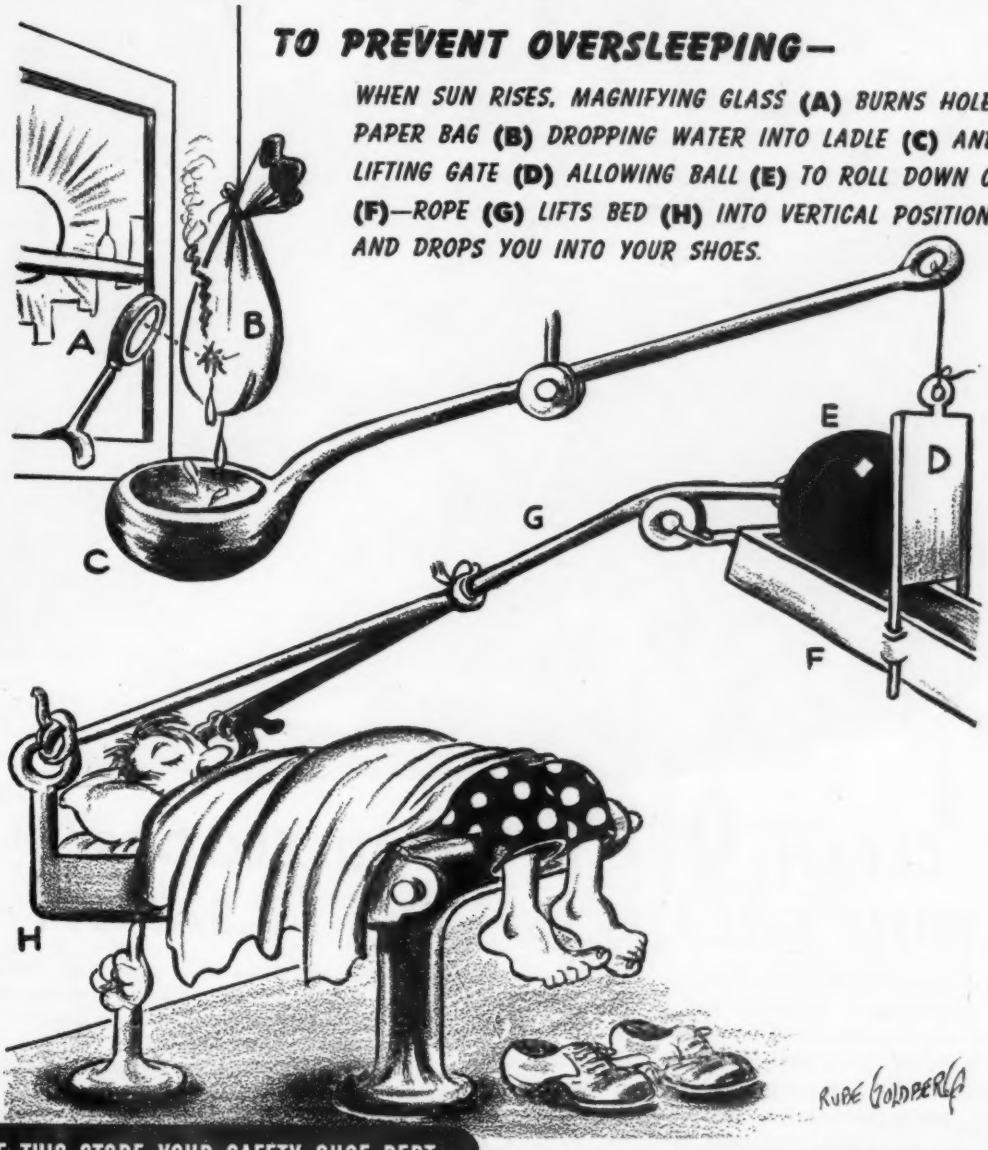
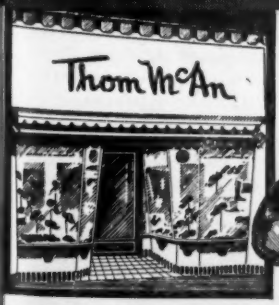


MAKE THIS STORE YOUR SAFETY SHOE DEPT.



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ONE WAY to approach the foot safety problem in your plant is to provide Safety Shoes of some brand that your men don't know—or perhaps don't like.

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Let us stock our Safety Shoes for you in our own Thom McAn retail stores, fit them with our own trained fitters, without cost or obligation on your part. You, freed of "shoe store problems," can concentrate on more important things, make yourself a more valuable man. Proof? Details? Write for them—today.

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Finnell makes equipment for dry scrubbing as well as wet scrubbing, and for dry cleaning, waxing, and polishing. Also a full line of *Cleansers, Sealers,* and *Waxes,* as well as *Steel-Wool Pads, Mop Trucks,* and other accessory equipment.

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Occupational HAZARDS

VOLUME 9 • NO. 4

"There's Profit in Prevention"

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COVER: Welfare Supervisors and Accident Prevention Officers are present in every British factory to see that machines are guarded and workers wear safety equipment. This heavy press has front and side safety guards which rise in the "off" position. Note also the enclosed fly-wheel, and the bonnie operator's safety cap and apron.

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Featherlight

Spectacles in Use . . .

. . . and out of the way

These spectacles, designed by the Safety Division of Jackson Products, are for light welding, cutting, and brazing operations, where complete eye covering is unnecessary. They are known as "LTB-50" . . . take 50 mm. lenses, shades No. 3 to No. 8.

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In Canada: *Levitt Safety Appliances Co., Toronto 12, Ont.*

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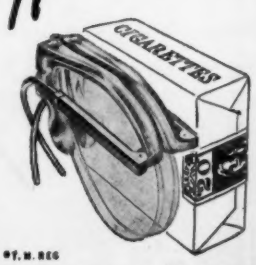

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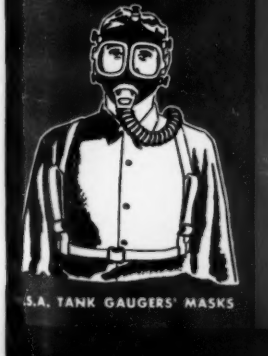
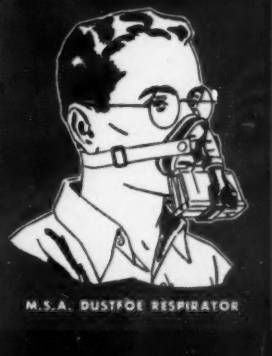


M.S.A. TANK GAUGERS' MASKS



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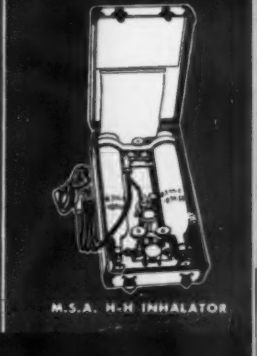

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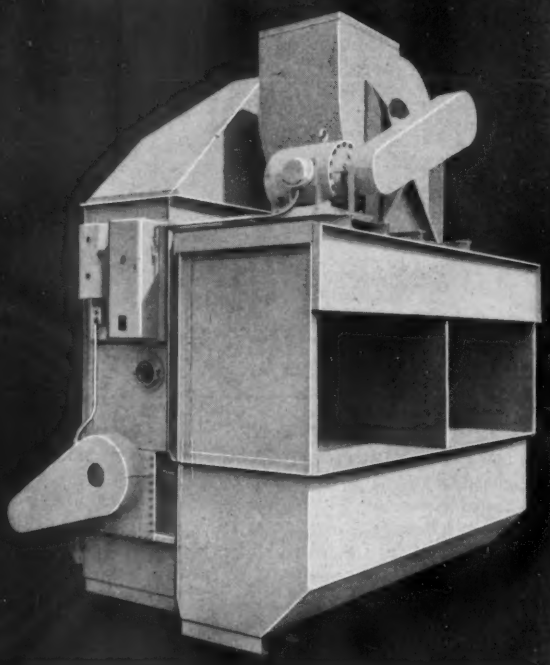

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Pictured above is a 2-compartment Magnesium Grinding Booth. One of 16 in operation in a single plant.

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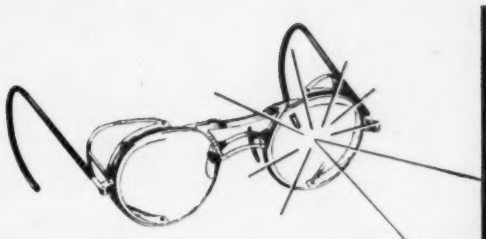

PROTECTION OK

CORRECTION ?

EYE SAFETY IS A TWO POINT PROGRAM

• A complete eye safety program requires more than eye protection. At least half of all industrial workers need visual correction if they are to see clearly. Industrial eyewear, incorporating correction professionally prescribed for the requirements of every job, is safety eyewear in two ways. It provides protection against injury to the eyes, and it provides clear vision that makes for working safety—and efficiency. Your Bausch & Lomb distributor offers prescription service on a wide range of types of Bausch & Lomb industrial eyewear.

SAFETY FACT-FINDING CASE HISTORY...

The Bausch & Lomb Industrial Vision Service, through the Ortho-Rater system of visual performance measurement, offers fact-finding as a basis for visual standards. The chart above shows how, in one department, accident-prone workers are identified on the basis of visual performance alone. Improved safety records, plus increased production, improved quality, reduced labor turnover, and lowered training costs are some of the results enjoyed by subscribers to the Bausch & Lomb Industrial Vision Service.

← Write for this descriptive bulletin A-591.

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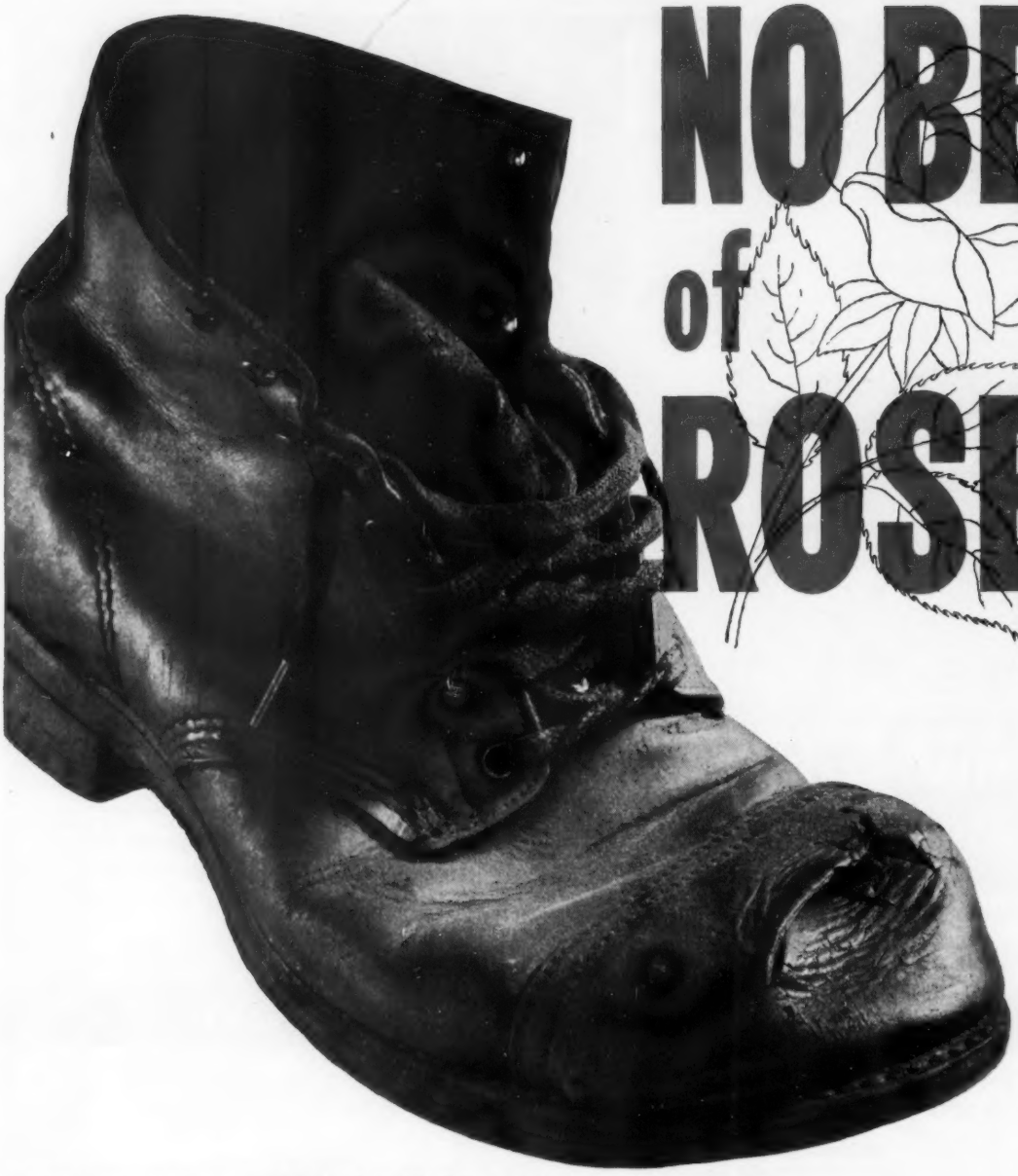
NO BED of ROSES



A LIFT CHAIN SLIPPED. 600 pounds of steel bedplate crashed down on this Lehigh safety shoe like a power-driven sledge. The 1800-pound impact actually imbedded a corner of the bedplate in the Lockrim* steel toe box. The workman in this Lehigh had only two bruised toes! Four days layoff. No great news. Safety shoes are supposed to save toes. But no safety shoe was ever built to take punishment like this. Lehighs do and deliver. Feet and toes come high. Lehighs don't. Phone or write us today and we will have a representative call.

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LEHIGH ALLENTOWN, PA.

SAFETY SHOE COMPANY

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Welders, heat treaters, lab workers and other heat exposed employees don't always run to the dispensary with what they consider unimportant burns. But it would be better if they did — and got adequate treatment against infection.

How Does Your Plant Treat MINOR BURNS?

Serious burns in most plants are immediately placed under the doctor's care or are dispatched to the hospital, a process which insures professional skill in treatment. The same is not true of minor burns, however, and neither compulsory reporting nor immediate dispensary treatment is standard practice—nor are all first aid attendants agreed on what measures are best in preventing infection.

MINOR burns are frequent occurrences throughout industry wherever heating processes are involved or in plant laboratories where work frequently brings unexpected heat exposures. Too often, unless the pain from the burns is severe enough to compel dispensary treatment, the inflamed skin remains unattended and vulnerable to dirt and infection. Even with first aid, the attention may not be adequate.

Such burns are usually not more than second degree and are small in area, making disadvantageous the treatment that has been developed during the war years for more extensive burns.

This problem of minor burn treatment has received particular attention in a paper prepared recently by two members of the staff of the Boston University School of Medicine, Saul Malkiel and William C. Boyd, and published in the Journal of the Misouri State Medical Association. Practical treatment methods were arrived at by the two authors after considerable experience and research in the field, indicating that it was high time the industrial nurse or the plant first aid attendant reviewed new and old-fashioned techniques in disposing of calls for minor burn treatment. In addition, current "cure-alls" were analyzed in the paper and certain of the authors' conclusions regarding the advisability of their use were advanced and are presented here in brief.

The finger doesn't look pretty, but it is typical of infections that can follow inadequately treated minor burns. Such infections can be fatal.

First of all, three main objectives should be uppermost in first aid routines set down for minor burns, according to this study. In the authors' own words, they are "(1) The skin should be preserved intact whenever and wherever possible; (2) Infection of the burn should be avoided; and (3) The pain should be relieved.

"With minor burns, the skin generally is intact at first and it has been our experience that a liberal application of a saturated aqueous solution of picric acid is generally enough to tan the skin sufficiently so it does not break, especially if light dry sterile dressings are used temporarily for portions of the body exposed to friction or abrasion."

As a "standing order" for the industrial nurse, picric acid also satisfies (2) and (3) in that it is a mild antiseptic and anesthetic, meaning that it both sterilizes and reduces pain in the inflamed area. Studies made indicate that pain in a minor burn is scarcely noticeable within 30 minutes following the application of picric acid.

In regard to the possibilities of infection, the chances of bacterial entry are negligible as long as the skin remains unbroken. Ointments may soften skin dangerously, making breaks more probable.

LOCKHEED CALLS IT

By JACK F. HATTON

Chief Safety Engineer, Lockheed Aircraft Corporation

LOCKHEED Aircraft Corporation subscribed a long time ago to a basic philosophy of industrial safety realism: worthwhile safety results require the mutual cooperation of employees and employers alike, which in turn requires the employer to make the first move. Why? Here are their two reasons:

1. Injuries resulting from unguarded machinery and poor physical equipment are usually the more severe type and are often expensive. Furthermore, they raise havoc with the life of the injured persons and their families.

2. It is extremely difficult to get employees actively participating in the safety program unless the employer first evidences good faith and a genuine desire to do his part by providing them with a safe place to work.

This desire took various forms, only a small part of which can be pictured here. Drive mechanisms of machinery were guarded. Other dangerous moving parts were enclosed against personal contact. Point of operation guards were provided to protect hands. Elevated platforms were provided with rails and toe boards. Stairways were enclosed with handrails, etc.

The physical equipment improvement program led us, we believe, to develop some rather ingenious machine protective devices which may be of benefit to other concerns utilizing the same type of machines.

For instance, about four years ago a woodworking employee had replaced the cutting knives in a single vertical spindle shaper. He tightened the lock nut down with his fingers and then decided to get a drink of water. Upon returning to the machine, he forgot to cinch down the lock nut with a wrench, and started the machine. Nothing happened until he pushed the work in to the knives, upon which they flew out with the speed of a bullet, one striking the operator's torso. Fortunately, the portion it struck was not vital and a quick recovery occurred.

This accident prompted Lockheed to equip all of its shapers with the unique hinged shaper guard pictured here, hardwood construction backed up by quarter-inch steel plates. These guards proved to be a good investment in realism. Following the installation, another machine because of a broken spindle threw a large knife directly at the operator. Instead of getting a fatal wound in the center of the stomach, the knife merely imbedded itself in the wood portion of the guard.

Power driven deburring rolls were made so safe that for several years totally blind employees have been given employment as operators. Fixed barrier guards over the rolls and immediately in front of the nip points act as limit switches upon contact, at once shutting off the power and applying brakes for instantaneous motor shutoff.

Right: All Lockheed shapers have these specially constructed, hinged hardwood guards backed by steel plates. The author (at left) tests the lever locks.

Left: Note prominent safety signs cautioning both operators and visitors on this two-hand machine operation.

"Realism"

This Month's Plant Picture Story Accents "Built-in" Safety

As far as we can determine, Lockheed was the first company to apply electronics in the form of photo electric cells to safeguard the back of large square shears. Fixed barrier guards at the front allowed only 3/8 inch clearance, permitting entrance of material but keeping out fingers. On long sheet stock jobs, however, an employee had to work at the rear of the shear also, out of view of the operator and exposed to knife and pressure injury.

Before an injury occurred, the company installed a photo electric cell whose beam reached across the entire width of the rear of the shear. Interruption of the beam by any part the rear man's body flashed on a red light and prevented tripping of the machine. In thus safeguarding many operations, Lockheed has found that photo electric equipment eliminates barriers or enclosures which sometimes interfere with the maximum output of the machine or process. Each individual application, however, must be carefully thought out before installation.

The evolution of elevated work places in the aircraft industry followed the trend, especially in the case of commercial airliners, to larger and higher structures. This development presented the problem of securing safe and suitable equipment whereby employees could reach the elevated portions on the airplanes to perform assembly, inspection, and flight line operations. The major assembly operations in the plants were taken care of by means of fixed stands and work platform. The flight line operations, however, required portable equipment to service each airplane. The photographs show the aerostands and platforms which evolved, all portable, lockable, hand-operated and equipped with handrails and toe boards.

Improved Safety and Output

Safety and output improved quickly by this realistic substitution for the old stepladder technique. Stepladders were given rather rough usage and the maintenance cost on them was high. In spite of a careful inspection system, several injuries occurred as a result of defective ladders. Occasionally an employee would become confused and attempt to come down the wrong side of a stepladder and fall. Others lost their balance on the top ladder platforms.

Furthermore, because of the restriction of freedom of movement, I have always believed an employee can not work as efficiently from a stepladder as he can from a stand. Where we have found stepladders still practical, we provide them with steps on both sides, a 1/8 inch steel band around the top platform, and more width of step per foot in ladder length.

Naturally, there are many phases to a successful industrial accident prevention program and they are all important. But I would like to reiterate the first realistic step is to improve the condition of the physical equipment in the plant, thereby furnishing employees a safe place to work.

Right: A Lockheed "aerostand" that is portable for flight line operations. It has a hydraulic pump for varying the height and lock pads on the wheels.

Left: Goggle carts bring "door-to-door" fitting and adjusting service from the safety department.

BASKET • POINT OF OPERATION • ELECTRONIC • PULL BACK • DUAL CONTROL • GATE • ETC.

Tips . . .

ON POWER PRESS SAFETY

The increasing use of metal stamping in modern industrial products has made the problem of power press safety an important factor in industry. The problem has special significance in industries wherein it is necessary to make continual changes in the size and character of objects produced and where various designs of presses and dies are used.

IN SOME well-guarded plants, presses may be found running with guards dismantled or with types of guards which do not fit the need of the job or the speed of the press, or with no guards at all. Presses with elaborate guarding measures taken at the point of operation may have a flimsily designed guard or none at all on the fly wheel. While most of the attention has been given to the point of operation guard, so that the operator cannot be caught by the descending dies, provisions are not always made to take care of variations which are not covered by the guard normally provided with the machine.

Point of Operation Guards

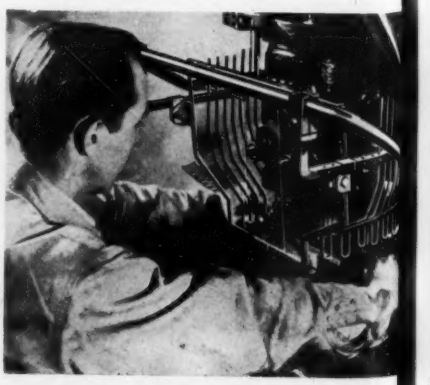
Of all the types of guards available, the one offering the greatest degree of safey is that which entails the use of an automatic feed or a magazine feed so that the operator is not required to have any portion of the body within the area of operation. Presses with guards of this type, including automatic insertions and ejection, while adaptable to only certain types of materials and operations, could be utilized to a much greater extent through the ingenuity of those responsible for plant safety.

Basket type guards can be designed and constructed with adjustable features so that they may cover a wide variety of operations. These may be constructed of rods shaped to allow the insertion of the material to be punched or stamped, while not permitting the entrance of the operator's hands. These rods may be held in position with suitable framework, with separate units furnished for different operations, or the rods may be supported so as to be adjustable, forming a barrier around the operation.

In an endeavor to keep operators' hands out of the area between the dies, several types of pull-back devices are available. The general operation of these devices is that as the press descends, a lever transmits action over a cam to a rope which is attached by a leather harness to the worker's hand. With these devices properly adjusted and maintained, it is impossible for a worker to have his hand between the dies when they close, as the device pulls the hand back out of the area. It is

Safety guard for punch press slide-fe dies in use in industrial control punch pr department, General Electric Corp.

An adjustable basket guard adopted the punch press department of Harley Da son Motor Co., Milwaukee. Only two m accidents have occurred there since t adoption of this type guard over 10 years a



Called the Swinging Die Closure, this new guard is custom-built to fit power presses used in blanking operations. An unusual safety feature of the die closure is the transparent Plexiglas shield, barely visible at the front of the guard, which is reported shatter-resistant, splinter-proof, and a transparent protection against flying metal particles, yet which has an adjustable frame for horizontal movement. (Junkin Safety Appliance Co. Photo).

"HEY, YOU'RE STILL WEARIN' YOUR GOGGLES!"
COMFORTABLE HEAD BAND
BROAD-BEARING NOSE-REST
RESTS GENTLY AT ALL POINTS
DIRECT AND INDIRECT VENTILATION
QUICK SIMPLE ADJUSTMENT
WORKERS HARDLY KNOW THEY HAVE CESCOS ON

● Honestly, workers hardly know they're wearing CESCO cup-type goggles. That's because CESCO cup-type goggles are *designed* to be *worn comfortably*. They fit as they should. The cups rest gently at all points—on the eyebrow, nose bridge and cheekbone. No pressing discomfort. No pinching. Broad-bearing nose-rests "float" the cups and add to ease of wearing. Quick, simple bridge adjustment assures comfortable fit on varying facial contours.

● You'll prove these points for yourself after you order CESCO cup-type goggles. Write now.

CHICAGO EYE SHIELD COMPANY

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CESCO **FOR SAFETY**

necessary to check these devices for proper adjustment when new dies are put into the press, and to check the wearing parts so that none may break loose and fail to provide the protection expected.

Gate Guards

Gate guards which may be swung into and locked in position are better fitted for some types of work.

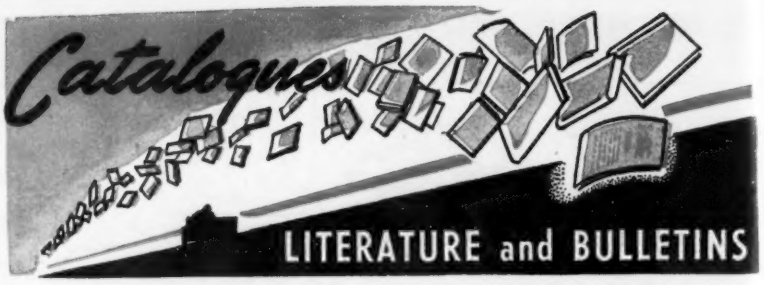
Another type of guard is so constructed that it closes the opening in front of the dies before the die descends. Any obstruction, such as a worker's hand, or arm, which is contacted by the closing guard, stops the press action with sufficient clearance to protect the worker. This type of guard may be operated by mechanical means or by an air pressure device.

A sweep type guard is also machine actuated. This consists of an arm which swings across in front of the dies to push the worker's hand or arm away from the point of contact. As with all guards, this type must be firmly attached and properly adjusted, so that the sweep arm is timed with the press stroke in order that no part of the operator's hand can be in the danger zone or exposed to contact during more than one-half of the down stroke. These should be tested after each setup to determine the proper timing. The length of the sweep arm must be adjusted to each job, so that it covers the setup as completely as possible. In some cases, it may be advisable to provide a baffle on one side of the sweep arm.

Dual Controls

Another method is to provide two-hand control, so arranged that the hands of both of the operators must be on these controls before the press may be operated. This type of control may also be used in conjunction with a foot pedal requiring three contacts to operate the press. Where two or more operators are engaged in work on one press, dual controls for all operators can be provided so that all hands are on control devices when the press is in operation.

(To be continued)



The publications featured on these pages were written by experts. They may be obtained without charge. To obtain these use the postcard bound into this issue.

FL 560—Rust and Scale Remover . . . General and technical data in bulletin form giving information on Troxide, a dry compound chemical which eliminates hazards of acid handling and storing in removing rust and scale from ferrous, nonferrous and precious metals. Manufactured by Waverly Petroleum Products Company.

FL 561—Steel Scaffolding . . . Safway Steel Products, Inc., offers information in a new 30-page illustrated brochure on Safway Scaffolding and Equipment, an assembly of steel tubing welded into safe, rigid, durable units for use in construction and maintenance work.

FL 562—First Aid . . . Pamphlet information on a flexible assortment of standardized unit packages of medication, dressings and equipment designed for emergency first aid treatments in varying types of industry, available from the Medical Supply Company.

FL 563—Oil & Grease Absorbent . . . Literature giving information on Quik-Sil, an oil absorbent compound used on industrial floors as safety protection against slipping accidents and fires. A product of the Diversey Corporation, Trojan Products Department.

FL 564—Industrial Skin Cleanser . . . Booklet explaining the composition of Formula SBS-11, a non-abrasive vegetable-scrubber type powdered skin cleanser, and pointing out some of the more important differences between it and other products; issued by the Sugar Beet Products Company.

FL 566—Automatic Fire Detector . . . Booklet issued by Gamewell Company describing this company's Vigilarm, a new, improved fire detector system that automatically discovers fire, warns building occupants and summons fire department.

FL 567—Eye Protection . . . A new 8-page bulletin by Mine Safety Appliances Company describing in detail a complete assortment of eye protection equipment for every application including Speedframe, a goggle mounting which eliminates troublesome hand adjustment.

FL 568—Safety Equipment . . . T. J. Cope, Inc., new catalog which includes information on "Cope" underground and aerial cable installation equipment together with safety equipment for those operations, plus many new items used by telephone companies, central stations and municipal plants.

FL 569—Visual Aid . . Descriptive folder from Keystone View Company featuring information on the Keystone Overhead Projector, useful for presenting slide or strip-film safety instructional material.

FL 570—Gauge Glass Protector . . . Informational bulletin on Kleervu Safety Gauge Glass Protector, a metal and "Nuglas" protective shield used as a safeguard against injury from flying broken glass and escaping chemical spray resulting from gauge explosion. Manufactured by Wright Austin Company.

FL 571—Incentive Awards . . . Latest publication of Award Incentives, Inc., "How Industry Profits From Service Awards" giving information on effective emblematic devices for use in plant safety and service awards.

FL 572—Sandblast Hose . . . A new catalog leaflet describing safe sizes, weights and O.D. of sandblast hose designed for maximum wearing action of sharp abrasives is available from the B. F. Goodrich Company.

FL 573—Safety Ladder . . . Bulletin from Ace Safety Ladder Manufacturing Company on a portable safety ladder for use in case of emergency when fire prohibits the use of regular fire escapes.

FOR YOUR TECHNICAL FILE
Save Pages 19-20
For Future Reference
A Gold Mine of Information!

The WHAT and WHY of INDUSTRIAL SKIN DISEASES

A139. AGE AND SEX AS FACTORS IN SKIN TROUBLES. Young, new workers are more subject to acute forms of dermatitis, while older, longer-employed workers are more subject to the chronic eczematoid forms. The great numbers of women who have entered industry represent new workers subject to acute skin troubles, but this factor is offset often by the greater attention they give to personal cleanliness and protection of hands and face.

A140. UNCLEANLINESS. All authorities agree that the lack of cleanliness in person, clothing or place of work is one of the main factors inducing skin troubles.

A141. WORKING TEMPERATURE. A worker dresses more lightly in warm weather and thus exposes more skin to hazards. This partially explains the high incidence of skin diseases in warm weather. However, in cold temperatures hazards may be increased due to less frequent bathing and the subsequent failure to keep the skin clean of irritant substances.

A142. GENERAL HEALTH AND SUSCEPTIBILITY. The skin defense mechanism is acutely related to the general well being of the body, even including the emotional state. In certain cases the presence of focal infections in the teeth, tonsils, or sinuses is known to contribute to the production of a dermatitis. In other cases, a history of infantile eczema or other skin troubles, asthma, hay fever, urticaria or other allergic disorders affect susceptibility in a positive way.

A143. IMPORTANCE OF PRE-EMPLOYMENT EXAMINATIONS. The omission of a pre-employment examination in hiring a worker permits concealment of the worker's history of repeated skin lesions, or his susceptibility to even mild irritants. This is especially unfortunate when the job involves exposure to dermatitis. From an introductory examination, skin features can be discovered, such as specific complexion susceptibilities or the existence of troubles like athlete's foot and other infectious skin diseases.

A144. HANDLING THE NEW WORKMAN. An employer should carefully inform the new man of all personal protective procedures, the maintenance of good hygiene, avoidance of undue exposure, and the necessity for wearing of all protective devices. Where dust, grease, oil and grime are prevalent, these procedures should include the maintenance of separate lockers for work clothes, as apart from street clothes (both within easy access of showers). Where exposures to dermatitis are unavoidable, instructions in the use of protective clothing, protective ointments and suitable cleansers are mandatory. The use of showers and suitable industrial cleansers should be stressed because personal cleanliness is one of the most important preventives of occupational dermatitis.

A145. WASHING THE DANGER AREAS. Frequently overlooked by workers in hurried wash-ups are thumbs, nails, areas on the little finger side of the hand and forearm, and the skin between the fingers. Too often, workers wash only the palms, a dangerous habit when skin disease prevention is at stake.

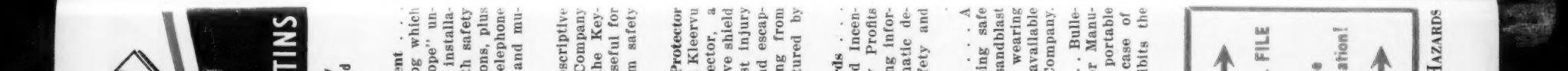
A146. PRIME PLANT REQUISITES FOR AIDING PERSONAL CLEANLINESS. In the interests of good skin health, plants should have adequate sanitary plant facilities for washing, bathing and dressing, plenty of hot and cold water with an adequate supply of the proper cleanser for every job, with individual paper or cloth towels. Wash basins should be arranged for convenient use in a light airy room that encourages attendance and permits good housekeeping. Proper receptacles for used towels should be available.

A147. STRESSING BATHING OR SHOWERING FACILITIES. In processes where irritant chemicals, dusts, gases, fumes, mists, vapors or sprays come in contact with workers, complete washing, with suitable cleansers, under showers should be compulsory at the end of each shift. Facilities should be adequate, light, sanitary and kept free from athlete's foot fungus by live steam treatment or other methods, and by facilities for medical foot baths.

A148. SPECIAL WASHING FACILITIES IN HAZARDOUS PLANTS. Plants with processes that promote skin troubles should provide adequate, sanitary, group washing equipment, or one vitreous, glazed, or enamelware wash basin for every five employees and one shower for every 15. Separate washrooms must be provided for men and women, and at least one basin must be convenient to each toilet room. Hot water and convenient soap-dispensers should be standard equipment. Individual paper towels are mandatory. Preferred fixtures are of the single hot and cold water combination type and all water must be approved by state or local authorities. No strong alkalis or cleansers should be permitted. When oils or solvents are needed as cleansers for skin contaminants, their use by workers must be supervised or otherwise regulated. In a small plant known to have no skin hazards, the basin facilities are usually proportioned as one washroom fixture for every 10 employees. When such a plant employs more than 100 workers, the proportion can be reduced to one for every 15 employees. For the basis of computation, 24 inches of sink-space may be considered equal to one wash basin. Group washing equipment meets many requirements for efficient washing facilities.

A149. "ADEQUATE" DRESSING ROOMS. Men and women should be provided with separate, ample dressing-room space. The rooms should have sanitary lockers and should be located near wash rooms. Two-compartment lockers are essential for workers exposed to skin hazards to keep work clothing apart from street clothing.

A150. SKIN CLEANSERS AS HAZARDS. Since workers want to remove rapidly and completely all dirt, dyes and other foreign substances from the skin, they often



The WHAT and WHY of INDUSTRIAL SKIN DISEASES

use harsh cleansers, such as strong abrasive soaps with high alkaline content, or they use powerful solvents, such as naphtha. Dermatitis can result frequently from with abrasive features. These not only tend to dissolve the protective skin layers, but often contain volatile agents, which defat the skin, and bleaching agents, which cause chemical changes by chlorination and oxidation.

A151. RECOMMENDATIONS FOR AN INDUSTRIAL SKIN CLEANSER. A normal, suitable, industrial cleanser for general use should be freely soluble in hard, soft, cold or hot water. It should remove fats, oils and other soil without harming the skin. It should not extract the natural fats and oils from the skin. It should not contain harmful abrasives or irritant scrubbers, which not only injure the skin but may clog the plumbing. It should be handy to use, if in solid form, or flow easily through soap dispensers, if otherwise. It should not deteriorate or become insect-infested.

The following composition is recommended by the U. S. Public Health Service: An industrial cleanser should consist of a neutral toilet soap, super-fatted adequately and containing a wetting agent or synthetic detergent, plus a soft scrubber which softens or dissolves in water and does not clog the plumbing. It should contain a minimum of free alkali, should have a pH of ten or less in a 1% solution, and should contain no silica, quartz, pumice, feldspar, rosin fillers or organic solvents.

A152. ABOUT DETERGENTS. Any soap solution that emulsifies oils (or sets an alkali that loosens dirt and soil) and which dissolves greasy matter to permit ready rubbing from the skin is known as a detergent. Chemicals are added to soap to increase the detergent action. Some increase the alkali content, some soften hard water, and some assist as synthetic wetting agents.

A153. WETTING AGENTS. In order to clean dirty skin easily, both dirt and skin must be wet by the cleanser. A wetting agent lowers the surface tension of liquids, enabling them to spread over the skin surface and penetrate into the pores, as well as enabling the solution to penetrate oil or waxy films in a manner to "make water and oil mix."

A154. SOFT SCRUBBERS. A good soft scrubber is made of ground cornmeal or other soft cereal which aids detergent action, when added to soap, by physical removal of tenacious oils or greases from the skin.

A155. LATHERING. Lathering does not make a cleanser more effective, but workers like lathering detergents. Cocoanut-oil soaps lather well and the addition to any soap of sulphonated castor oil or moderate amounts of alkali will increase the lathering.

A156. SOAP SENSITIVITY. Some workers have soap-sensitive skins and in addition, there are many who have chronic eczema, or dry-fissured skin, or who are exposed to the organic solvents, cutting oils and other petroleum oils that defat and thus dry the skin. All of these should use industrial cleansers containing no toilet soap or alkali. Harmless colloidal clay, mixed with a synthetic detergent and lanolin, is a good substitute.

A157. SOLVENTS IN HAND CLEANERS. For cleansing stains, such as indelible inks, etc., it is better to add an organic solvent, such as naphtha, to the soap itself than to permit the hands to come into contact with the pure solvent.

A158. SPOTTING SKIN DISEASES. Common warning signs of a skin disease vary from a little reddening of the skin, with itching and burning, to blisters, swellings, and frequent boils—usually, but not always, on the exposed surfaces. Among workers who have their hands immersed in liquids over long periods of time there is possible involvement of the fingernails and similar exposed tissues, which appears as a deformity or ridging of the nails.

A159. REPORTING SYMPTOMS. No matter how slight the case, the worker with skin disease symptoms should consult a doctor. Self-treatment may aggravate the condition and prolong the illness. Early discovery and treatment mean less lost time, less suffering and less compensation to be paid.

A160. OCCUPATIONAL ASPECTS. Skin trouble can be judged to be occupational, if: 1. It develops soon after beginning new work. 2. Medical evidence shows it to be possible in such work, or if others on the job have it. 3. Removal from the job results in improvement. 4. No existing skin condition, medical treatment or outside exposure, is in process at the time of the occupational exposure. 5. The trouble appears in general on the parts of the body exposed to the irritant.

A161. COMPARING SYMPTOMS. Symptoms of dermatitis due to primary irritants such as cement, lye or an acid, usually occur shortly after exposure begins. Specific irritants, such as oil, resins or insecticides, require at least a week of contact and sometimes more before the skin becomes sensitized.

A162. LOCATING DISEASE SYMPTOMS. Skin eruptions of occupational dermatitis usually occur on the exposed parts of the skin. If the irritant is a solid or a liquid, the eruptions usually are on the hands or forearms. If it is a fine dust, vapor, mist, etc., the eruption appears on the face and neck. In either case, clothes soiled with the irritant may affect the body areas. Friction points, such as the belt line, wrist line, may be especially affected.

(To Be Continued)

Duralite Goggles

A-O improved No. 301A Duralite Goggles provide comfortable eye protection for workers exposed to the hazard of flying particles coming from any direction.

Individual eyecups are anatomically molded to fit the contour of the right and left eye. Smooth, round edges of the cups fit snugly against the face, protect the eyes from objects striking from the sides, top or bottom. Serrations in the edge of cups, ventilated retaining rings, plus extra side perforations, provide greatly increased ventilation, produce a natural draft behind the lenses reducing the possibility of fogging. Available with 6 Curve Super Armorplate lenses, clear or Calobar.

GIVE WORKERS MAXIMUM PROTECTION & COMFORT

A Correct Type of Goggles for Every Industrial Need

Send to American Optical Company, Box , Southbridge, Mass., for a copy of this booklet. It describes in detail the complete line of A-O Cup Goggles for use by chemical workers, chippers, welders, foundry men and workers exposed to general dust conditions.

American Optical COMPANY *Safety Division*

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

workers like lathering detergents. Cocoanut-oil soaps lather well and the addition to any soap of sulphonated castor oil or moderate amounts of alkali will increase the lathering.

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(To Be Continued)

from

MANAGEMENT'S POINT OF VIEW

HERE IS SCIENTIFIC HELP FOR INCREASING PRODUCTION THROUGH

Better Industrial Vision

Coordinating the results of extensive research of vision requirements for scientifically determining the skills necessary for performing hundreds of jobs, many of the nation's foremost optical research laboratories have developed reliable and accurate visual performance tests which show definite relationship to the skills required for certain jobs.

THE fact that eyes control 80% of all human motions makes eye care imperative if industrial accidents are to be reduced. Workers who are to become healthier, happier, calmer, and ultimately safer on the job must have good scientific eye care planned and furnished for them. Thus, in the correction and control of inefficient industrial vision, management must take into consideration the relation between visual performance and job efficiency.

Lack of maximum job efficiency is often due to an individual not measuring up to the standards necessary for a job, because he does not have good eyes and experiences blurred vision, headaches, and other discomforts, and loses a finger or is fired from his job because of mistakes. In short, how "good" an employee's eyes are, depends entirely upon what performance is required of them. A crane operator needs good depth perception and keen far vision, while a typist requires good near vision. Similarly, a lathe operator viewing his work at a distance of 25 inches may require different visual skills from an assembler holding work only 10 inches from the eyes.

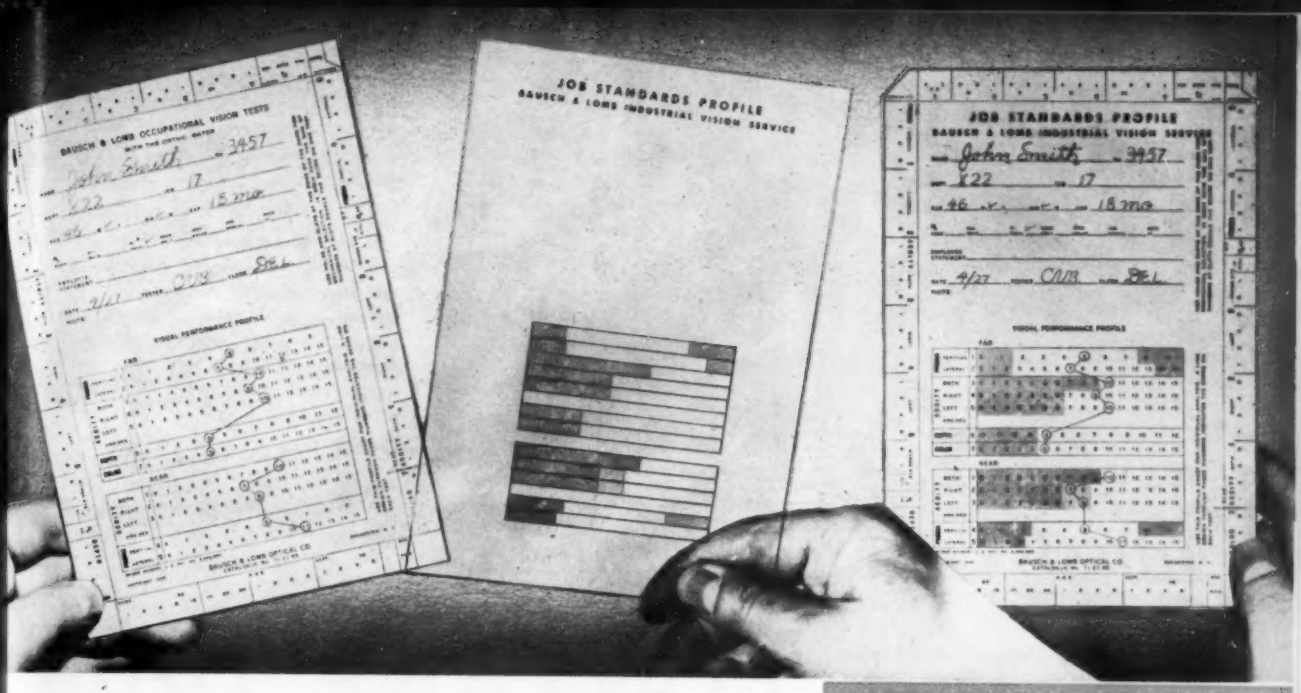
Your safety engineer, personnel manager and plant health officer must realize that the familiar wall chart for testing eyes is no longer adequate for measuring the visual capacities of employee-selectees best qualified for any definite jobs in their plant. They agree that it is extremely unfortunate to indiscriminately slap on protective eyewear without taking into consideration the basic sight abilities of their employee. Especially when modern scientific instruments and tests for measuring visual performance are available. It is logical that only by determining the standards of visual performance for the employee's particular job that proper eyewear can be determined which will assist in the increase of employee efficiency.

These modern systems for measuring visual performance are not only one answer to the question of the relationship between visual performance and industrial efficiency, but are a means of obtaining information leading to methods of decreasing accidents due to faulty vision. With these means, your company health officer and personnel manager can screen out applicants who fail to meet standard eye "skills" necessary for certain job operations, or transfer those now employed to other jobs in order to better conform with individual eye skill capacities.

In determining visual abilities to fit job requirements through uses of this type program, management will find that these tests accurately divulge:

1. Employees and applicants whose visual performances are most suited to specific jobs.
2. Those employees who are in need of professional eye care because their visual performances are inadequate for their present job.
3. Certain jobs that need to be redesigned or supplemented with better illumination because visual adjustments are so severe few persons can adapt themselves to them.
4. That considerable saving to the organization is made even if only a few comprehensive injuries can be prevented each year.

Bernard T. Parker of Bausch & Lomb Optical Company, one of several manufacturers of visual performance testers, administers the series of seven "far" tests set 26 feet from the eyes by an optical arrangement within the instrument. The device, designed in cooperation with Purdue University, is not a diagnostic instrument but merely measures visual performance: phoria (eyeball position), acuity (sharpness), eye muscle balances, color and depth perception.



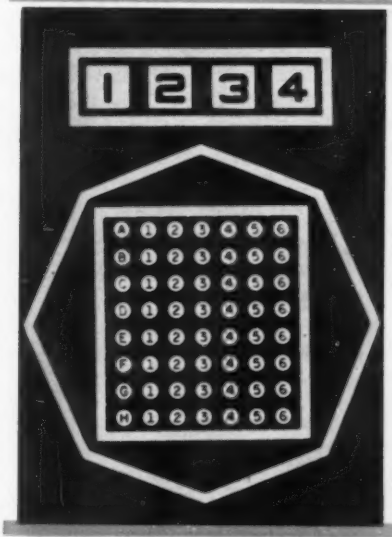
5. That a comprehensive visual program builds desirable relationships between management and employees.

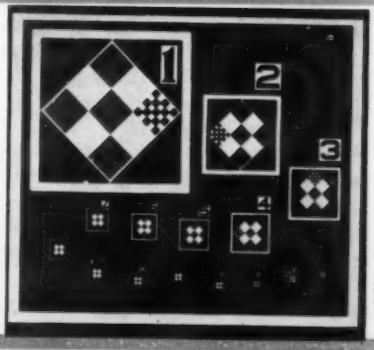
Paying particular attention to employee visual performance helps management quite as much as it does the employee. Any method which increases the health and efficiency of the worker and at the same time, gives additional comfort and creates better attitudes toward work, enhances the employee's productive value, both to himself and management. Where visual job standards are introduced it has been possible for employees to earn and produce far more. Studies in many plants throughout the nation have demonstrated a definite relationship between ability to reach visual performance standards and average hourly earnings, which have been found to run 14 cents more per hour than those who did not meet visual standards. In addition, the quality of work has become considerably higher, while the accident rate usually drops below average to an appreciable extent.

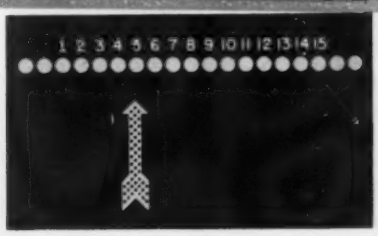
A program for adequate measurement of visual performance is a valuable objective instrument which management can give to the safety engineer as an additional device for establishing more employee efficiency and creating lower accident records — two stepping-stones to increased production.

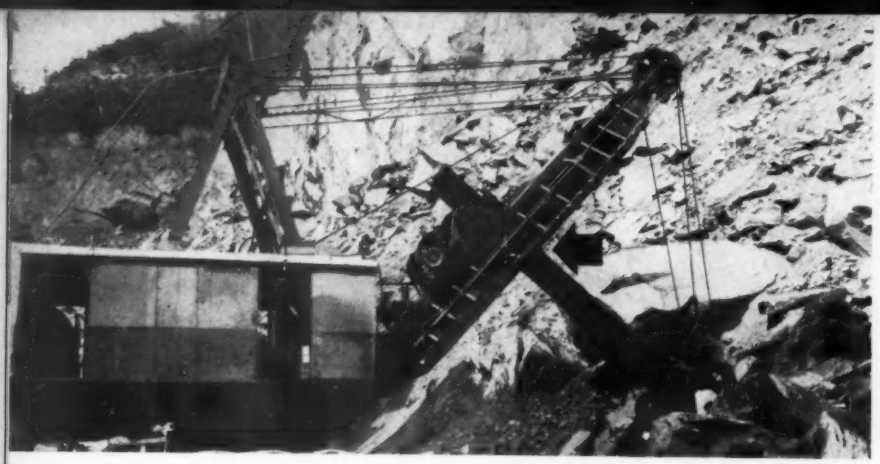
Example of visual findings (above, left) and a typical job "profile" (above, center) containing red, green and colorless squares indicative of visul skills required for specific job, with (right) the two together, personal chart viewed through the transparent profile. If the individual's visual diagram falls within the shaded section of the profile, he does not meet the job's requirements. His personal eye skills are considered suitable for the work if they conform to the pattern of the colorless squares. Different jobs call for different visual skills, and eyes are neither "good" nor "bad"—they merely compare to what performance is required of them.

These are the typical diagrams viewed in testing for visual performance, which also includes color perception and eye muscle balance: A—depth perception, B — acuity, C — phoria (eye position) vertical, (below) phoria, lateral.









Electric Shovel used at Fontana construction. Arrow points to the mechanical water spray mounted on the A-frame which not only eliminated health hazards to a far greater extent than manual wetting, but also eliminated dust fog and the handling of hose lines in the vicinity of the dipper. (Pit and Quarry photo).

Dust Control Lessons From FONTANA DAM

By FRANK N. CHIRICO, Engineer
Occupational Health Section
Tennessee Valley Authority

The construction industry is on its way toward clearing its name as a hazard producer. Helping it to recover from a high mark of 2.27 man-days lost per 1,000 man-hours worked are improved dust control processes such as those outlined here.

CERTAIN features of the dust control system introduced during the construction of Fontana Dam in North Carolina were not only unique but because of their extreme effectiveness in curtailing hazards have become a pattern for the industry.

While the magnitude of the Fontana project intensified the normal problems of construction, the relatively simple solution arrived at are applicable to most construction jobs at one phase or another. On the Fontana job, the source of the aggregate was quartzite rock of from 70 to 75% free silica obtained from a quarry with a face about 1,000 feet long and 300 feet high. One-hundred-ton charges of explosive dislodged the rock, which was transported by means of three-cubic-yard electric shovels and 12-cubic-yard trucks to a couple of 42-inch gyratory primary crushers. A secondary crushing and screening plant of 800 tons capacity produced the required aggregate and sand.

The required cement totaled approximately one-half million tons. It was unloaded from box cars and blown by compressed air through 3,000 feet of six-inch pipe to storage silos and subsequently transferred to a concrete mixing plant which produced almost three million cubic yards of concrete for construction purposes.

Engineering controls had to be established for silica and cement dust exposures in quarrying, rock crushing, cement handling and concrete mixing operations. Workers chosen for employment in these dust producing operations were placed at jobs commensurate with their physical limitations. These were determined by complete pre-employment examinations supplemented by chest X-ray, periodic examinations, and appropriate clinical laboratory tests.

The silica dust exposures in the quarry and rock crushing plant were maintained below an average of four million particles per cubic foot and all cement dust exposures were maintained below an average of ten mppcf. This maintenance of a favorable working environment permitted the employment of men possessing limited degrees of non-disabling fibrosis.

Starting at the quarry, drilling was done with well drills, a relatively dust-free operation, and auxiliary drilling of boulders was done wet with jackhammers. Next came a newly developed control feature, a mechanical water spray for controlling the silica dust exposures produced during the excavating and loading of rock by the electric shovels. The water sprays were mounted on the A-frames of the shovels and served to continuously and thoroughly wet the rock. The following are some of the advantages derived from the use of this spray:

1. It reduced the dust exposures from averages varying from 10.1 to 44.6 mppcf. in the quarrying and dumping zone of the rock crushers to averages of 1.43 to 2.71 mppcf. This reduction has not been found possible by intermittent manual wetting.

2. By spraying the rock in the quarry the water had an opportunity to thoroughly wet the rock prior to its being dumped into the crushers.

This eliminated a serious dust exposure at this point, one otherwise not eliminated, since wetting at the time rock is being dumped into the crushers does little to reduce the dust exposure at the dumping zone.

Manual wetting at the crushers in the past has been undesirable. Applying water as the rock is being dumped results in over-dosing of certain portions of the rock and completely missing others. The excess water that is not absorbed by the rock's surface passes off through the crushing system as a stream of water. Such improper wetting practices, which clog chutes and adversely affect conveyor belt performance, were eliminated.

3. It completely and thoroughly wetted the rock and loaded trucks with a ½-inch hose more effectively than could be done manually with a 1½-inch hose. The handling of a ½-inch hose involves considerably less manual labor than the handling of the larger hose. The spray completely eliminated manually wetting the rock in the near vicinity of the moving dipper and thus removed a possible source of injury.

4. By eliminating dust fog it increased the visibility in the shovel zone at night, thus increasing shoveling rate and safe rock handling.

Rock Crushing and Screening

Rock leaving the two 42-inch gyratory primary crushers was conveyed to a secondary crushing and sizing plant where it was crushed into various size aggregate and sand. A screening plant classified the aggregate into various size stock piles. From the stock piles a conveyor belt transports the aggregate and sand to the concrete mixing plant. A small portion of the sand was diverted through a sand drying and screening plant where "sand blast" sand was produced.

Efficiently designed ventilation systems, with a total capacity of 85,000 cfm., enclosed and exhaust ventilated dust producing processes and properly applied wet methods reduced the severe dust exposure to an average of less than four mppcf. Dust control features included: the total enclosure of indoor screens; the provision of top and skirt-board coverings at transfer and discharge points and the extension of these enclosures to the outside of the building where necessary; the provision of dust-tight manholes, counterweighed hinged covers on chutes for accessibility and self-closing doors at housed-in screens; the discharge of the dust collector effluent through high stacks, thus affording adequate dilution and dispersion of dust so as not to contaminate working areas; the installation of water sprays, properly designed and located and spraying a total of eight gallons of water per minute—the spray shut-off valves being conveniently located so that water could be easily turned off when conveyor belts were stopped.

Cement Handling

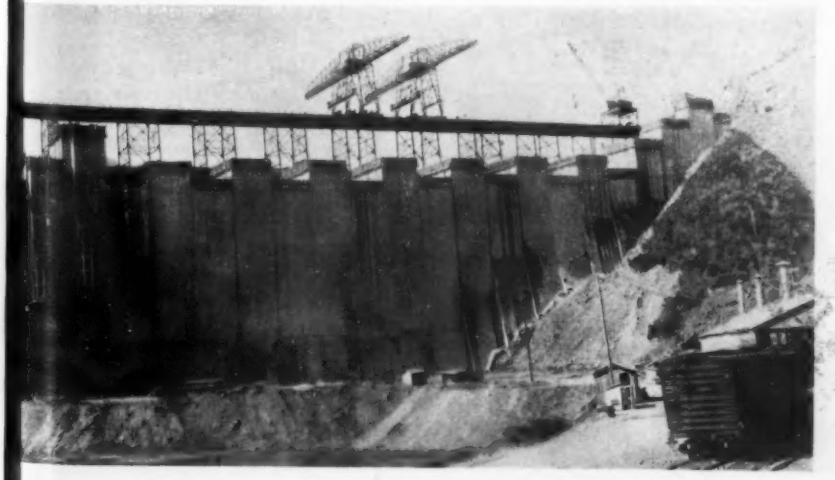
In the cement unloading plant, cement exposures that averaged 295 mppcf. were reduced to an average of less than 10 mppcf. Ejector ventilation systems, designed on the job, were installed to exhaust the enclosed dust producing sources. The same systems also served to reduce the dust, temperature, and humidity exposures inside the box cars by supplying clean air to the worker who unloaded cement from the cars to a hopper by means of a power-shovel. These improvements not only provided a favorable working environment but also resulted in an increased plant output of 20% and in a significant reduction in labor-turnover in a job previously highly undesirable.

A view showing the intake line to the cement dust collector and safety valve constructed at the center of the storage silo. The equipment not only protected the workers' health but resulted in a substantial saving of materials.

Two cement collector systems were designed and fabricated on the job and installed at the silos where cement was recovered from the dust laden air discharged from the silos into the atmosphere. The cement collector systems eliminated a "dust nuisance" in the silo and concrete mixing plant areas while the recovered cement represented a substantial saving.

Concrete Mixing Plant

The dust control methods employed in the concrete mixing plant reduced the cement and silica dust exposures from an average of 193 to less than five mppcf. This was followed by a reduction in the number of complaints of upper respiratory irritation.



Box car loaded with cement entering the unloading shed showing the ejector ventilation stacks at the roof of the building. An upstream view of the dam appears in the background.

The Pay Off

Each month Occupational Hazards magazine plans to select one or more outstanding safety plans in some industry that have paid off in a dollars-and-cents return attributed directly to reduced compensation costs or indirectly to uninterrupted production of indispensable personnel.

Company ledgers too often have no provision in their columns for this investment of time and effort.

SAFETY is not a new subject at National Electric Products Corporation, Ambridge, Pa. The initial drive to eliminate the cause of accidents was started during the war production days of World War I. Old-timers remember the safety rallies which the company conducted in the plant cafeteria some twenty years ago. In those days this manufacturer of electrical roughing-in materials was known as the National Metal Molding Co.

Employees of 1925-28 were encouraged to attend an evening Safety Rally by assurances of musical entertainment, talks by safety authorities, and door prizes! Invitations distributed to employees announced, "yourself, family and friend are cordially invited—good speaking, orchestra and vocal entertainment!"

The twice-a-year rotation of men as members of the plant safety committee has been a major factor in keeping to a minimum the frequency and severity of accidents at the Ambridge plant.

Early in January and June of each year, Dave Woods, personnel and safety director, requests department foremen to assign a representative for a six-month membership on this committee.

The group of twelve meets every Wednesday morning at 11 o'clock. Under the chairmanship of Mr. Woods, discussions are held relative to possible safety hazards. Recommendations are made for improved safety practices. The committee members also receive instruction in approved safety practices. These fifty-minute meetings are scheduled on "company time."

Over a five-year period, the practice of changing the personnel of the safety committee twice each year results in each department having a dozen men thoroughly indoctrinated in safety practices. The value of this constantly growing safety representation has also proved to National Electric supervision as being a considerable aid to the maintenance of high morale.

The work of the safety committee is augmented by a similar group composed of women from those departments where female labor predominates. This committee meets the first Wednesday of each month—also on "company time." Results to date, according to Mr. Woods, prove definitely that men have no corner on discovering conditions or operations believed to be detrimental to employee health and safety.

When these committee members complete their six months' service, National Electric honors their interest and participation in the drive for increased safety by a token "thank you" gift.

In June, the retiring men were each given a zipper-equipped wallet. The women were presented with vanity mirrors for their handbags.

The recommendations of the safety groups are taken up for action with appropriate department foremen. In some instances a general recommendation is made by the committee to R. W. Biggs, works manager.

Stimulate Action

The safety representatives are trained to stimulate prompt action whenever possible in the correction of a hazard. Grease on a floor, a bare spot on a "hot" wire, or a loose guard are promptly brought to the attention of supervision. Commitee members report on such accomplishments at the next gathering of the group.

An identifying "Safety" badge is given each committee member to wear on work clothes. In addition to the pride of possession factor, the badge provides an additional visual reminder of safety to all plant workers.

Mr. Woods, like many industrial safety men, is currently experiencing a tapering downward of the frequency curve from its wartime level. The departure of temporary help and the return from the Armed Forces of trained workers are contributing factors to the reduction of accidents.

Surrounding Dave Woods, safety director at National Electric Products Corporation, are some of the members who serve a six-month term on the Ambridge plant's safety committee.

BE CAREFUL!

Yes, we marvel at the amazing work of modern machines ... we say "they can almost think."

But they can't think. That's why Machine accidents occur ... unless the men who operate them do the thinking.

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help to prevent machine accidents by urging men to be careful on or around machinery ... to THINK!

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ACCIDENT PREVENTION SIGNS IN STANDARD COLORS AND DESIGNS

The Medical Profession Looks at POWDERED ALUMINUM AND SILICOSIS

The inhalation of large amounts of aluminum powder over many years had no harmful effect on aluminum workers. The powder is now a method for therapeutic treatment of silicosis.

Inhalation of aluminum powder, while not a cure for silicosis, results in the reduction of symptoms of silicosis and in an increased capacity for work in a significant high percentage of cases.

Inhalation of aluminum powder gives no evidence of toxicity.

There is early evidence that aluminum therapy will be of value as a prophylactic measure.

●

D. R. JOHNS, M.D., and S. J. PETRONELLA, M.D.
East Chicago, Ind.

THE treatment of silicosis with aluminum powder, which already in the past years has been the object of studies in Canada, has been recently brought in this country. Thanks to the results of these studies, one can now count hundreds of cases treated.

The studies revealed that the disability in silicosis was due mostly to the thickened alveolar walls interfering with the normal gaseous exchange, and only slightly to fibrosis. The researchers maintained that silicia which was retained caused an inflammation in the alveolar walls while being transformed into silicic acid in the presence of body fluids.

Study Powdered Aluminum

They then set about to find a non-toxic substance which would reduce the solubility of the siliceous material, and after investigating many substances found that aluminum powder inhaled by silicotic animals diminished the extent and degree of thickening.

The next step was to determine whether aluminum, when inhaled by man, was injurious. In 1939 a study was made of 125 men employed in Pittsburgh aluminum foundries. These employees had for many years been engaged in the manufacture of finely powdered metallic aluminum, over a period of 6 to 23 years, the average for the group being 12 years.

Effect On Humans

Heavy concentrations of aluminum had been inhaled by these men over this long period of time, and the records disclosed that the health of these men was better than that of 3,000 workers in other sections of the plant. X-ray films of the chest disclosed no abnormalties attributable to aluminum. Consequently the investigators concluded "that the inhalation of even large amounts of aluminum powder over many years had no harmful effect. It did not cause lung damage nor favor the development of tuberculosis or any other pulmonary condition."

Therefore, feeling that aluminum powder might act as a theapeutic agent in already established cases of silicosis, a clinic was set up at the Porcupine Gold Mines in Timmins, Ontario, where Drs. Crombie and Blaisdell conducted their treatment of human silicosis. Similar treatment was carried out at Washington, Pennsylvania, by Dr. J. W. G. Hannon. Both investigators concluded that:

1. Inhalation of aluminum powder is harmless and gives no evidence of toxicity.
2. Inhalation of aluminum powder results in improvement of the workers' morale, health and production capacity.
3. Inhalation of aluminum powder would prevent the development of human silicosis.

Powder Mill Used

The aluminum powder is manufactured in a mill approved by McIntyre Research, Limited. The mill consists of an aluminum cylinder 12x12 inches, mounted on a ¾-inch hollow shaft. This shaft, inside the mill, has a large number of small perforations on either side of a short central core which prevents the inspired air from being drawn directly through the shaft without entering the cylinder.

The shaft is connected by means of a perforated cam to a reducing gear operated by a ¼ h.p. electric motor, rotating the cylinder at approximately 72 rpm. The opposite end of the hollow shaft is connected to a 12-liter glass bottle serving as a settling chamber where the coarser particles of powder settle out.

A charge of 25 pounds of chemically pure aluminum pellets (sheared from $\frac{3}{16}$-inch aluminum rod and measuring about $\frac{3}{16}$ in. length) is placed in the cylinder; a small amount of aluminum powder is also introduced with the pellets as a "primer." Before use, the mill is operated about one-half hour so that maximum efficiency is reached. In general, at an air flow rate of 10 liters per minute through the mill, about ⅔ milligrams of alumi-

num powder per liter of air are produced. This powder is black in color, having the appearance of soot and assays 20 per cent metallic aluminum and 80 per cent oxide.

After the warming up period of about one-half hour, the 12 liter bottle is connected to the patient by a 2-inch rubber tube with a mouthpiece at the end. The mouthpiece has the shape of a T with a double Douglas valve at the ends of the top portion, consisting of metal and rubber discs held in place by a metal screw valve. The valve prevents re-breathing into the system.

The nose is clamped lightly, and as the subject inspires, air enters the shaft through the perforations on the other side of the center core. The powder-laden air enters the glass bottle, where the coarses particles settle out, and the finer particles enter the outlet tube at the top of the bottle to which the subject is connected.

The men stand while breathing, consequently being able to breath much deeper, and receive a better distribution of the powder throughout the dependent portions of the lungs. It is difficult to determine the exact amount of powder inhaled. A good portion of the powder remains in the mouth and upper respiratory passages.

It is also possible that much of the powder reaching the smaller bronchi is excreted. To be effective the powder must reach the terminal bronchioles or alveoli and be retained for a considerable time in order to permit the coating action on the silica, whereby the solubility of the silica is lessened, thereby reducing its irritable action.

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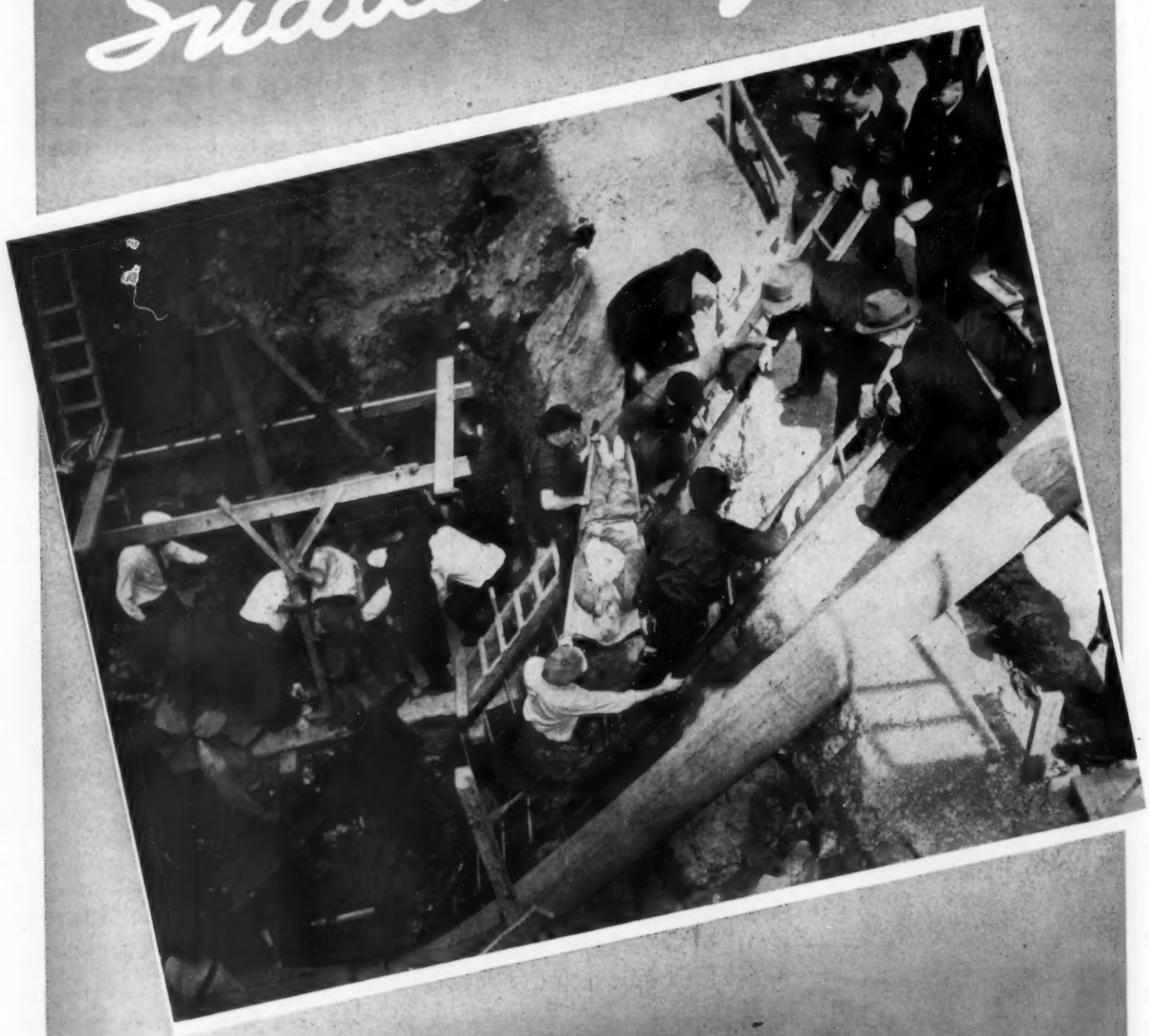
. . . And Sudden Injury



Just what is fresh air? Why all the fuss about good ventilation—checking your breathing zone and all that instrument testing—especially when you're working outside? You've heard of workmen going down into an empty tank outdoors, with the lid off, and never coming out alive. Or shipping dock men working outdoors behind trucks with motors idling—and keeling over. Well, here is one of three workmen on an "outside" construction job being carried out of a caisson hole. →

. . . And Sudden Injury

NONE of the three men who had gone down to work at the bottom of the hole remained alive to tell the story. Fellow workmen said "Black damp!" Just like in mines. A good safety director could have told them about ventilation needed in deep holes, even outside. The men of the rescue squad knew. They went down with gas masks. They knew of the quick injury possible to cells just from a shortage of oxygen.

The air we breathe is a mixture of gases. Certain gases tend to replace air in the space they fill. Carbon dioxide is like that. Pure country air contains about 0.3 per cent carbon dioxide. Air exhausted from our lungs has about 4.1 per cent. That's what "black damp" really is—carbon dioxide given off by the oxidization of coal. Carbon dioxide is heavier than air and tends to settle at the bottom of closed rooms, sewers, brewery vats, idle kilns, wells, shafts, etc.

It's all a matter of proper ventilation. The three workmen in our story exhaled their own ultimate lethal gas in a matter of minutes. They never knew what hit them. A breakdown of hemoglobin starved of oxygen, unconsciousness, then death.

The story is repeated daily on a much less dramatic scale—short of death—in countless poorly ventilated workrooms. Especially in cold weather, when windows are closed off in factories. In that case effects of the gas on workers are measured in activity slowdown, a loss to production. Impure air symptoms are headache, dizziness, drowsiness, general weakness, sweating, ringing in the ears and fast breathing. All those may precede coma and suffocation. Actually, one per cent of carbon dioxide in the air can cause unconsciousness.

The answer is simple. If the natural ventilation system of a plant is found inadequate in winter, mechanical means are needed. A machine shop, for example, should have from 15 to 20 air changes per minute.

Enclosed spaces should be ventilated thoroughly and *tested before* workers enter. Otherwise, air-supplied respirators and rescue harness should be provided. In any case, when men descend into pits, a cardinal rule is to post a guard above. The saddest words a rescuer ever has to report are "Too Late."

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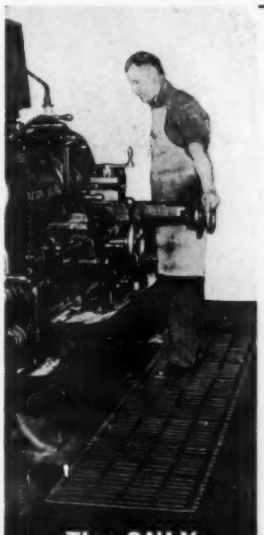

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A superior, long-wearing mat for promoting safety and providing comfort. Beveled nosing on all sides. For use around machinery, on ramps, wet floors, and in shower and locker rooms. 5/8" thick, up to 6' wide, any length.

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A tough, durable, rubber and cord matting that affords safety in wet or slippery areas. Ridged bottom affords aeration and drainage. Easily handled for cleaning. Keeps the feet dry. 3/8" thick, 24" wide, any length.

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Engineered SAFETY Never Relaxes!

To expect thousands of accident-free press operations daily without providing safety precautions is to invite danger. For operators can't hold such a pace without relaxing . . and tragedy lurks in every relaxed moment.

The solution, of course, is ENGINEERED SAFETY . . safety that is actually built in that can never "relax" . . never "forget!" That's how Junkin Safety Guards work. They're not merely "reminders." They're built-in to actually make safety a part of its operation. If you would like the facts about Junkin Safety Guards, write us. There's no obligation.

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936 W. Hill Street
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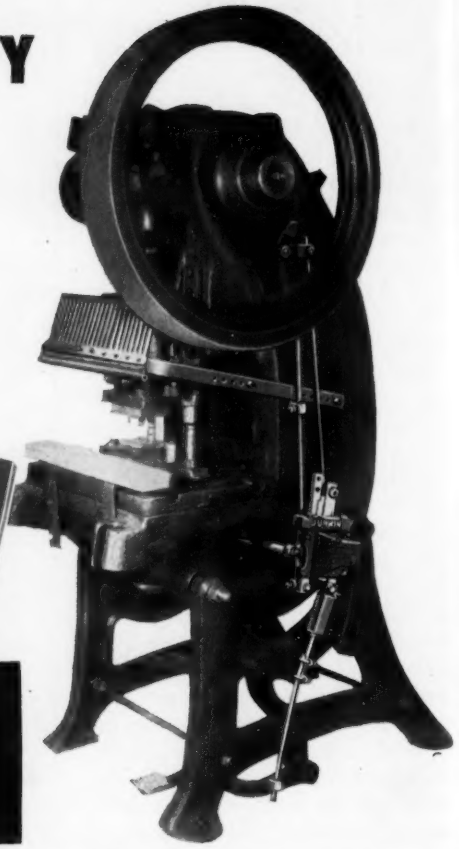

JUNKIN SAFETY GUARD

Why MURINE, a Buffered Isotonic Collyrium, is important in Industrial Hygiene

● Solutions that would be entirely harmless to the skin surfaces may injure the eye severely, due to osmotic pressure changes within the membrane cells. Pure water or hypotonic solutions used in the eye favor development of edema or swelling, while solutions of a higher salt concentration than the tears may cause a shrinkage or loss of water from the membrane cells.

It is important, therefore, that any aqueous solution used for cleansing or washing the eye be very close to the same osmotic pressure or be in isotonicity with the tears which normally bathe the eye. The osmotic pressure of the tears is normally much higher than that of the blood, corresponding to about 1.4% solution of salt. Murine has been adjusted to this range of osmotic pressure.

Normally, the tears are slightly alkaline, having a pH of approximately 8.0. Marked changes from this hydrogen ion content may also cause irritation. Murine has, therefore, been buffered to this pH range.

Murine is indicated for regular use in industrial plants where strong light, dust, or metallic particles are prevalent. In cases of injury to the eyes, Murine is an effective first-aid preliminary to medical inspection and treatment.

MURINE CONTAINS Potassium Bicarbonate, Potassium Borate, C. P. Boric Acid, Berberine Hydrochloride, Glycerin, Hydrastin Hydrochloride, 'Merthiolate' (Sodium Ethyl Mercuri Thiosalicylate, Lilly) .001%, combined with Sterilized Water.

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MEN AND MATTERS

News • Activities • Plans

NEW SELECTOR - GUIDE . . . There is no need to wade through text books for answers to fire extinguishing problems with the new vest pocket size Randolph Data-Guide. By using the handy selector which condenses 222 fire facts, the answers glide by as the selector card

moves out. The compact, rigid Data-Guide presents important facts about the suitability, maintenance and performance of soda-acid, foam, pump tank, dry powder, loaded stream, carbon tet, and carbon dioxide fire extinguishers.

Reverse side tells, in relation to plant fire hazards, how high units should be bracketed, distances of the extinguishers from the operators, and the area protected by each unit. Data Guides are available from Randolph Laboratories Inc., to safety, plant, and purchasing directors. Send requests to this magazine.

NON-SKID SHOE SOLE . . . The non-skid shoe sole, developed earlier to safeguard seamen on the pitching slippery decks of Navy aircraft carriers, is now proving a boom to industrial workers. Developed by A. C. Fellman, president of Fellman, Ltd., the Tri-Vac sole has been adapted to numerous civilian uses in situations calling for steady footing in slippery locations.

The Tri-Vac design covers three principles of traction. It consists of a series of deeply channeled triple rings of soft compound rubber. The rings in the tread furnish a squeegee-like action, the cups within each of the rings create suction, and the narrow channel traps water to provide a dry contact surface.

SET CANADIAN SAFETY RECORD . . . One million accident-free hours is the new all-time record for the oil industry of Canada established by the British-American Oil Company's Clarkson Refinery, Clarkson, Ontario. The latest and largest B-A refinery, whose accident prevention program is guided by Owen C. Good, Safety Supervisor, set the record over a three year period reducing the company accident frequency record and boasting the past 12½ months without a lost-time accident.

The occasion was celebrated with a mass rally of employees and divisional refinery managers. In attendance also were W. C. Whiteford, B-A president, J. G. Godsoe, M. S. Berringer and A. H. Miller, vice presidents, and H. H. Bronson, secretary-treasurer of the company. W. C. Gault, Clarkson Refinery manager, was the program chairman.

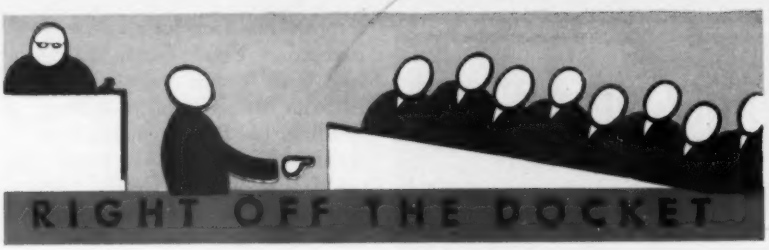
INDUSTRIAL HYGIENE HEAD . . . William E. McCormick has been appointed chief of the Industrial Hygiene Department of the B. F. Goodrich Company. Duties of Mr. McCormick's department will be to study operating conditions to see if

they are hazardous, and if so, eliminate the hazards. McCormick, who received his bachelor's and master's degrees at Pennsylvania State College, was formerly industrial hygienist with the Willson Company of Reading, Pa. Before coming to B. F. Goodrich Company, he served with the U. S. Public Health Service, Bethseda, Md., and was a member of the State Department of Health in North Carolina and in Georgia.

LANDRY TO P. O. SAFETY SPOT . . . In line with President Truman's recently promulgated Safety Program for the Federal Government, Acting Postmaster General Jesse M. Donaldson recently announced the appointment of Edward B. Landry, of Norwood, Mass., as Safety Director for the Post Office Department. The appointment marked the first time that the Post Office Deparment has availed itself of the services of a Safety Director. A graduate engineer, having

received his B. S. degree from Northeastern University in Boston in 1928, Mr. Landry brings to his new appointment in the Potsal Service a broad experience of some eighteen years as a professional safety engineer gained in industrial and commercial establishments. In the previous past five years, Mr. Landry served as Chief Safety Engineer for the Navy Department.

ACCIDENT REDUCTION GAINS . . . "Industry, which includes all classes of commercial enterprises, has made the greatest gains in reduction of accidents. However, the record is not so good that it cannot be improved; for there is evidence that the industrial accident rate since the war is on the increase. Better placement of the worker, improved supervision and, above all, acceptance by management of its prime responsibility for worker safety are the needs of increased industrial safety." So declared Julien H. Harvey, managing director, National Conservation Bureau, Association of Casualty and Surety Executives, in a recent article.



The trend of litigation on workmen's health and accident compensation is reflected in these briefs on the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist. Clip cases and file for future reference.

Filling Station Employee—Killed While Doing Mechanical Work

CLAIMANT'S son was employed to help attend a filling station, repair flat tires and to do similar things during the night when the mechanical shop was closed. On February 7, 1943, the son, Jesse, suffered an injury resulting in his death, when a car he was repairing at a garage owned by Woodhatch fell off the jack on which it was elevated and crushed him. From this injury he died on February 28, 1943.

The injury and death of deceased was admitted by Woodhatch but he denied that the deceased was engaged in the performance of any duties covered by his employment at the time of the accident. Woodhatch alleged that the deceased was never employed as a mechanic, and that during the entire course of his employment he was never required to perform any duties of a mechanic.

The deceased was employed at approximately $20.00 per week to assist the night shift in operating the filling station part of the business and to assist in operating the wrecker service in bringing wrecked cars to the shop. The deceased was working under the direction of his uncle, who was night foreman over the operations of the filling station. They worked from 7:00 P.M. to 7:00 A.M. each night.

ceased requested his uncle to permit him to go off his regular duties from

On the day of the accident the deabout 5:30 A.M. to 7:00 A.M. in order that he might repair the uncle's car so that they could return home in it. This action on the part of the deceased was voluntary as he was not ordered to do so by his uncle.

The lower court denied the claim from which ruling this appeal is taken. The sole question to be determined is whether the deceased was injured and killed by an accident arising out of and within the scope of his employment.

The record indicates that the mechanical shop was closed during the night and none of the mechanics were on duty at night. The evidence shows that the deceased rode with his uncle to and from work, a distance of about 15 miles. Woodhatch did not furnish transportation in connection with employment. There is no proof that the work being done by the deceased prior to his death was being done under his employment with Woodhatch. All mechanical work done in Woodhatch's garage was listed and charged under a regular system prevailing in this shop and there was no list or charge made of the work which the deceased was

ANYBODY FALL IN YOUR PLANT LATELY?
NON-SLIP SAFETY
Plus EXTRA WEAR
NEO-CORD
Resistance to heat, oil and acid plus the non-slip feature of Gro-Cord's original CORD-ON-END construction, makes these soles the safest, toughest-wearing bottoms for all safety shoes.
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RESISTANT
BOTTOMS THAT ARE TOPS IN SAFETY

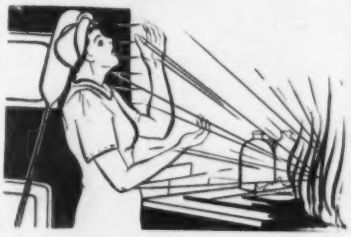
doing on his uncle's car. He was not working for the defendant when he met his fatal accident.

His death resulted from the slipping of the jack from the automobile, it did not occur from an accident "arising out of and within the scope of his employment. Not compensable. Loftin vs. Woodhatch. June 28, 1946 26 S. Rep. 2nd series page 704

Death By Fire—Action Filed On the Theory of Negligence

SYLVIA JOHNSON, a minor, while employed in a bakery, lost her life in a fire which occurred at her place of employment. The fire was allegedly caused by illegal storaging of gasoline in glass containers on the bakery premises. The breaking of one or more of such containers near the stoves and ovens caused an explosion and the resultant fire. Gasoline storaged in an underground tank also was used for servicing company cars and delivery trucks.

A common law action was filed line in glass containers and in the contending that the storage of gasounderground tank were in violation of city ordinances and state laws, and were "gross, wanton and unlawful." A request for dismissal of the action was made on the grounds that the Workmen's Compensation Law was applicable to the situation since the accident fully complied with the terms of the Act.



Claimant should have filed under such act and not under the theory of neglect resulting in wrongful death. The accident was deemed an accidental death as defined under the Compensation Act. The action was dismissed by reason of the fact that liability arose under the Workmen's Compensation Law and was compensable thereunder.

Hagger vs Wortz Biscuit Company
Supreme Court of Arkansas, 7-1-46.
196 S. W. Rep. 2nd series, page 1

Recovery Demands Proof Of A Definite Traumatic Episode

Simon F. Glick was hired as a polisher, and for a period of 11 weeks thereafter, operated a polishing machine which because of a worn out bearing vibrated excessively, causing a jarring of his hand as he applied objects to the wheel.

As a result thereof, the claimant reported that he developed a weakness in his left hand. He said that one day, while polishing a six-pound rod, the machine jammed causing bar to slip and strike the back of his hand.

There is no proof to show the time or the occasion during which the accident actually occurred. There is no testimony to substantiate a definite traumatic episode, therefore, this does not constitute an accident within the meaning of the Compensation Act. Recovery denied.

Glick vs. Wright Aeronautical Corp.
Supreme Court of N. J., 9-17-46
48 At. Rep. 2nd series, page 792

MODERN PLANTS HELP KEEP MANPOWER ON THE JOB with SANITARY BRADLEYS

Workers, in any plant, appreciate clean sanitary wash facilities—as a measure of health protection and, equally important, as a considerate act on the part of management. That is why progressive executives choose the most modern washing fixtures—Bradley Washfountains.

One Bradley Washfountain easily accommodates 8 to 10 persons simultaneously—serving them clean *running* water—while automatic foot-control and self-flushing drain protects hands from contaminating contacts, thus promoting health which helps keep manpower on the job.

Durably constructed for years of economical service, a Bradley installation cuts water consumption, reduces hot water costs, saves on piping as well as numerous plumbing connections. Bradleys are nationally distributed through plumbing jobbers.

BRADLEY WASHFOUNTAIN CO.
2259 W. Michigan St., Milwaukee 1, Wis.

BRADLEY *Washfountains*

For details and suggestions, send for illustrated Catalog 4308 and Washroom Layout Book.

Hard Working PROTECTION

Hodgman Industrial Aprons for Safety and Efficiency

No. 1032

Hodgman high-quality industrial garments give maximum protection, comfort and service to employees in every field. Fabrics are coated in our own plant to assure complete satisfaction.

No. 7100 (above) is a strong, black industrial apron which resists dilute acids and abrasion.

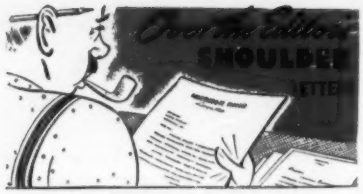
No. 7110 apron is made especially for acid protection.

No. 1032 Rubber Surface Work Suit is medium weight and waterproof, particularly suited for men who work under wet or muddy conditions. No. 1043 Parka Suit affords head to toe warm protection against foul weather. Ideal for airport personnel, truckmen, railroadmen and others.

No. 1043

Send for catalogue information about these and other Hodgman Industrial Garments.

HODGMAN
Rubber Company
FRAMINGHAM, MASS.



Methyl Bromide

OCCUPATIONAL HAZARDS:

I am interested in the article on page 67 of your October issue ("Using Butane or Propane?").

I have just been reading of competitive tests entered into by several of the major fire-extinguisher manufacturers in Mississippi; and it is especially interesting to note that Butane gas was used, because of its volatility.

I don't know the author of the above article, but perhaps he could give me definite information as to what makes it more volatile than some other products which are considered hard to extinguish.

And could I also be advised as to the value of methyl bromide being used as a fire-extinguishing agent, if shot or squirted onto the fire? I have been told that it is very fine, but your opinion will be valued most highly, indeed. — Franklin Finch, Manager, Finch Specialty Company, Kansas City.

Methyl bromide has been used as a fire extinguishing agent off and on since the '30's, original recommendation being based not only on its prompt extinguishing action, but because in contrast to carbon tet, thermal decomposition does not form phosgene gas but rather the less dangerous hydrogen bromide. This latter acts as a warning signal because of its irritant action on those exposed. However, recent tests on the toxicity of methyl bromide indicate that it is dangerous from the standpoint of leaking fire extinguishers and handling in general. The action on the body (anesthetic) is as dangerous as carbon tet. See Bulletin No. 185, *USPHS, and page* 109 *of October edition of National Fire Protection Association Quarterly for recent evaluations.—Ed.*

Thanks, Fellows

OCCUPATIONAL HAZARDS:

Congratulations on the transition of your publication OCCUPATIONAL HAZARDS from a small size to a large size magazine. This undoubtedly marks a point in its most suc-

There's No "CURE-ALL" IN CUTTING OIL SANITATION

Coolant Formulations and shop conditions vary widely — so do coolant handling problems. To prevent costly coolant spoilage with its foul odors and other disagreeable features, to maintain practical sterility, your Dolge Service Man is prepared to render this service:

1—**He will take samples of your coolant.**

2—**The Dolge Laboratories will examine them bacteriologically and chemically, WITHOUT CHARGE.**

3—**You will receive a complete, confidential report, including the bacterial count.**

Only then, and when found necessary, the **particular** DOLGE STERIDOL GERMICIDE to fit your requirements will be recommended. Employed as directed, the preparation will not irritate the skin or corrode metals . . . and it will prevent spoilage.

The cost? Less than 1 cent per gallon of coolant!

Write for booklet, "Cutting Oil Sanitation"

THE **C. B. DOLGE** CO.
WESTPORT, CONNECTICUT

STERIDOL
Cutting oil germicides

DEATH TO DISEASE
DOLGE

For Clear Vision...

FOG-GLE CLOTH

RETARDS FOGGING
CLEANS—POLISHES

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EASY TO USE
Practical — Economical

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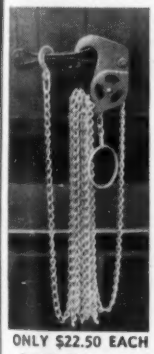

One man can open the most binding, balky box car door with the Monarch Car Door Opener. Get greater safety . . . speed loading and unloading schedules . . . order an ample supply to fill your needs today!

* No strained muscles. No slips or falls. No broken arms, legs or mashed fingers. No fatalities. No time wasted. No "gangs" needed. No time loss.

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MINING SAFETY DEVICE Co.
Dept. OH-2, Bowerston, O.

cessful career and I have noticed that the caliber and format of the magazine has improved considerably in the last year or so. — William F. O'Conner, Professor of Safety Engineering, New York University, New York City.

OCCUPATIONAL HAZARDS:

Your new revised edition of OCCUPATIONAL HAZARDS has just reached me, and I want to let you know that I find it a great improvement over all the previous editions. May I compliment you on this improvement. — R. E. Phillips, Safety Engineering Dept., Lumbermen's Mutual Casualty Company, Boston.

OCCUPATIONAL HAZARDS:

It has been my pleasure to read OCCUPATIONAL HAZARDS and wish to congratulate you on its fine content. — Howard E. Waugh, Personnel Department, Anchor Hocking Glass Corp., Lancaster, Ohio.

OCCUPATIONAL HAZARDS:

Congratulations on new size and a bigger and better magazine.—John B. Arnold, Providence, R. I.

OCCUPATIONAL HAZARDS:

We have followed your magazine since its early days and wish to take this opportunity to compliment you on the new size and scope of the current issue.

We feel that you are making a definite contribution to the success of organized accident prevention. — Stanley Owens, Safety Engineer, Tennessee Gas and Transmission Co., Houston, Tex.

OCCUPATIONAL HAZARDS:

Your full page photo called "Industrial Picture of the Month" was very dramatic and forceful. I think such a photo has enormous value in safety work when it can be displayed for employee consumption. I for one recommend printing of such a photo monthly.—Francis X. Fay, Personnel Director, The Rayon Processing Co. of R. I., Inc., Central Falls, R. I.

OCCUPATIONAL HAZARDS:

I wish to take this opportunity to extend my congratulations for the splendid improvement of your publication, OCCUPATIONAL HAZARDS.

Litigation cases in "Right Off the Docket" are especially interesting and informative.

HAIR PROTECTION
In Factory and Shop

No. 120 Hollywood Turban

Hollywood Turbans

The 120 Hollywood Turban does its part in safeguarding women's hair from dangerous machinery. And what's more, women LIKE wearing them!
Easily adjustable to any head size. Washable, require no ironing. Neat. In netting or cloth, in popular colors.
ORDER TODAY FROM YOUR SAFETY EQUIPMENT DEALER OR WRITE DIRECT.

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4 out of 5 INJURIES
are caused by Human Failure!

To overcome the "human element" in accidents, take that factor into account in all safety work. And there is a "human approach" to safety -- through personal, individual recognition of performance.

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Safety plans and procedures, based on award incentives, are now in successful use throughout the country. We'll be glad to work out a safety program for your purposes.

Write for free illustrated brochure.
"Safety Award Campaigns"

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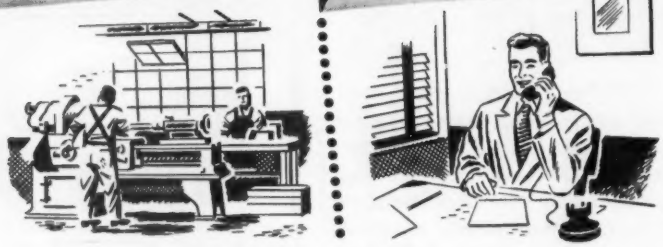
ON THE PRODUCTION FLOOR

IN THE EXECUTIVE OFFICE



SYSTEMATIZED SANITATION HELPS LOWER RISING PLANT COSTS

Manufacturing costs are reduced and production increased as your plant becomes a safer, cleaner, more orderly place in which to work. Maintenance costs are lowered through a more effective use of your present plant-keeping personnel. Gerson-Stewart's simple plan of Systematized Sanitation effects important savings daily for hundreds of leading concerns. Write today for complete information.

Systematized Sanitation enables your present labor to do more tasks—better!

The GERSON-STEWART Corp.

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HOFFMAN VACUUM CLEANING

GIVES YOU A SAFER PLANT AND INCREASED PRODUCTION

Hoffman Heavy Duty Industrial Vacuum Cleaning Systems are eliminating dust hazards and cutting costs in plants of almost every type. There are many applications where the use of Hoffman Vacuum Equipment will give you definite savings in time and costs on production operations and will put an end to your dust problems.

Vacuum cleaning eliminates blowing and removes hazardous metal dust which also causes product damage.

HOFFMAN SPECIALIZES IN VACUUM CLEANING SYSTEMS FOR INDUSTRY

SEND FOR LITERATURE

U. S. HOFFMAN MACHINERY CORPORATION

AIR APPLIANCE DIVISION

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Mr. U. D. Clark's contribution on fire training was very complete and practical. The charts on solvents are excellent and very useful.

In closing I might add that OCCUPATIONAL HAZARDS is truly the safety engineer's friend and consultant.—H. L. Blake, Safety Director and Engineer, Whitman & Barnes, Detroit.

Blankets and Showers

OCCUPATIONAL HAZARDS:

We would like to know if you would be able to supply us with the names of some manufacturers of fire blankets and emergency showers. We have seen the emergency showers mentioned in your book 1021 *Answers to Industrial Health and Safety Problems.* — Patricia Snyder, Research Librarian, Owens-Illinois Glass Company, Toledo.

We are forwarding you names of manufacturers.—Ed.

An Old Story

OCCUPATIONAL HAZARDS:

If Mr. Paul J. Black (August) and Mr. Arthur Gaboury (November) will refer to McGraw-Hill's "Industrial Accident Prevention" (1931), pages 18 and 19, they will find all of their factors in the "Hidden Costs" listed in the same order they had them and almost identically worded.

Mr. Gaboury said QAPIA had used a pamphlet (since 1931) for fifteen years. Anyway, Mr. Black listed three (Nos. 1, 2, 3 in the book) and Mr. Gaboury listed five (Nos. 4, 5, 6, 8, 9 in the book).

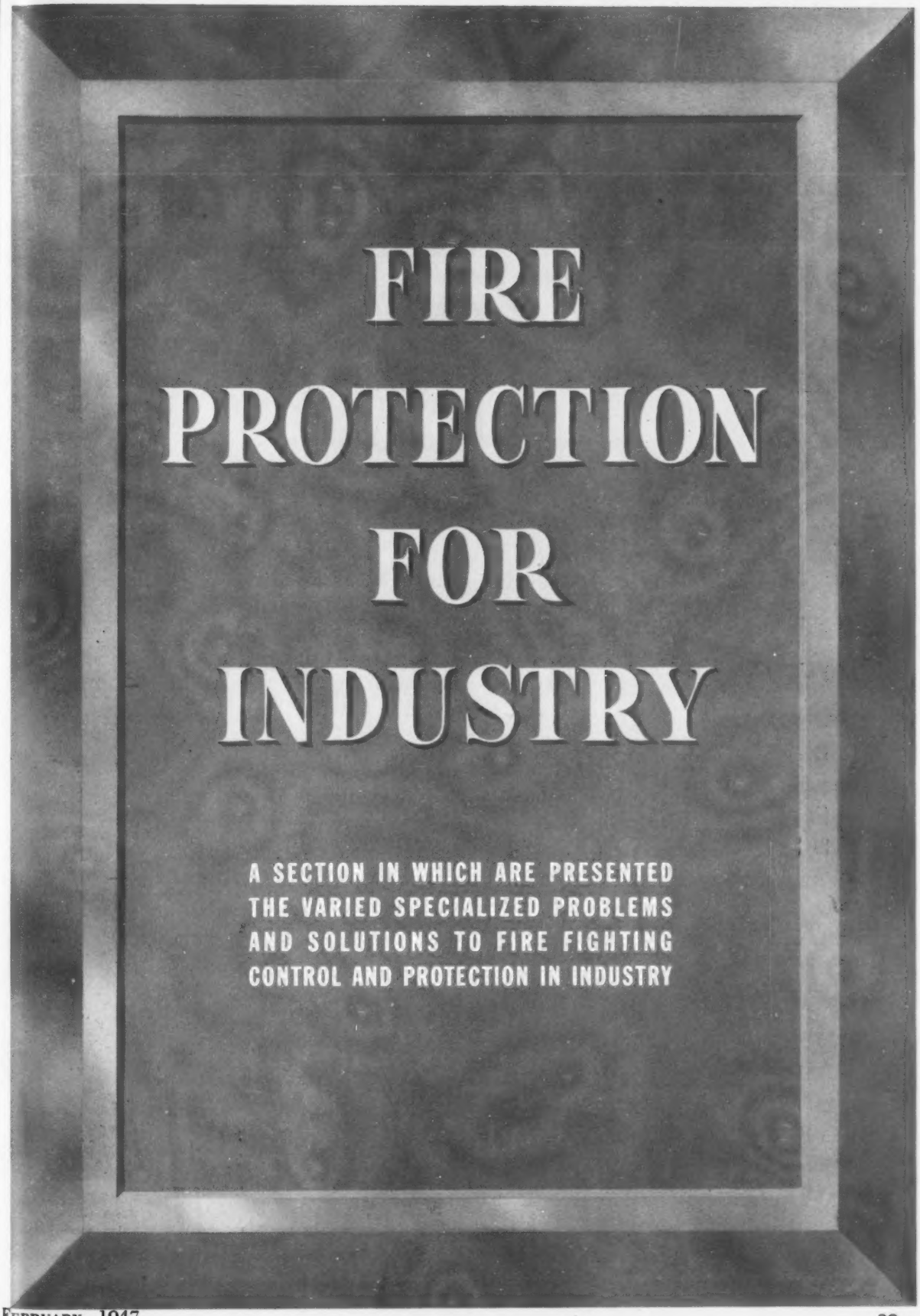
From the book, let me supply the missing items, 7, 10, 11, per your request at the end of your November article:

No. 7. Cost to employer under employee welfare and benefit systems.

No. 10. Cost of subsequent injuries that occur in consequense of the excitement or weakened morale due to the original accident.

No. 11. Overhead cost per injured employee—the expense of heat, rent, light, and such other items, which continues while the employee is a non-producer.

— Incidentally, I think your monthly magazine is exceptionally fine and getting better each month. I look forward to receiving it, and others here at Fairmont ask for it. Best wishes!—J. S. Hall, Safety Director, Owens-Illinois Glass Co., Fairmont, W. Va.


FIRE
PROTECTION
FOR
INDUSTRY
A SECTION IN WHICH ARE PRESENTED
THE VARIED SPECIALIZED PROBLEMS
AND SOLUTIONS TO FIRE FIGHTING
CONTROL AND PROTECTION IN INDUSTRY

Especially this year...

PROTECT WHAT YOU HAVE

• Replacements...whether these be buildings, equipment or stock...continue to be in scarce supply and in every instance much higher in price. So it is only good management to *guard what you have.*

Protect against fire by installing dependable fire-fighting equipment at *every* vulnerable location. Don't allow a small fire to grow destructively big during those crucial moments it takes to bring an extinguisher from one department or floor or building to another. Be prepared to fight any fire *instantly.*

We suggest those extra extinguishers you need, and which should be added immediately, be Buffalo *better-built* Fire Extinguishers. Now is the time to talk to your Buffalo representative who probably is listed in the classified section of your telephone directory. If he isn't, please write directly to us.

Buffalo VL Extinguisher

Buffalo FOAM-TYPE Extinguisher

Buffalo SODA-ACID Extinguisher

BUFFALO *better-built* **FIRE EXTINGUISHERS**

ESTABLISHED 1895

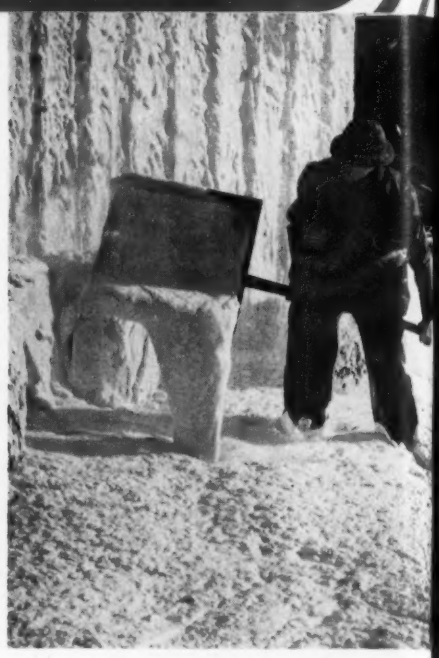
BUFFALO FIRE APPLIANCE CORPORATION
DAYTON 1, OHIO

The Industrial Fire Picture of the Month

Here is one more reason why the nation has a comparative soap shortage. Fats were in the fire for four hours recently at this Detroit soap company building while firemen worked themselves into a lather with 20 pieces of equipment in putting out the five alarm blaze. Efficient hose work kept the damage down to $50,000 in wasted suds and the fat-fed flames were brought under control before they could spread to adjacent buidlings. Three firemen were injured on the slippery premises, which were nothing if not clean by the time the last hose was folded up. A unique feature of the water action on the soap was to create homemade foam bubbles which eventually smothered the grease fires. Fire extinguisher companies have cheaper ways of producing foam.

Fire Protection FOR INDUSTRY

Technique of putting out fire by applying foam against wall, rather than directly into fire.



Foam has the property of sticking to vertical surfaces.

NOW . . . "Bean Soup" FOR INDUSTRIAL FIRES

Private industry is now getting the benefit of the techniques the U. S. Navy learned in fighting flammable liquid fires.

THE answer to "What's cooking?" in swabbie parlance in the Navy's fire-fighter training schools became the highly characteristic term "bean soup"—a heavy foam flame-quencher developed during the war for petroleum and flammable liquid fires aboard ship. It is just now that American industry is beginning to get the full story of that foam miracle which held down ship fire losses to a minimum during battles in far-flung waters. And now, at last, supplies of this war "soup" for fighting fires are available to industry for the control of its own costly fires in highly flammable petroleum products.

Left: Extremely hot oil fire being smothered by foam mixture of six percent (note can held by man) and water comprising 94 percent of stream. One or two men can easily handle such fire-fighting equipment. The operator takes a hose, equipped with a special nozzle, through which fresh or salt water is pumped in the ordinary way. Another smaller, shorter hose is screwed into the larger hose near its nozzle, with the other end of the small hose dipped into a can of liquid. Water being forced through the larger hose sucks up the specially concentrated "soup" and, through a special aperture, also draws in air. When these combine, a heavy, whipped-cream looking chemical gushes forth to form a blanket which separates the flames from the fuel they feed on, seals in gases and excludes oxygen.

Right: Two teams putting out high-octane gasoline fires with foam.

Need Fast Action

Such fires require exceptionally fast, sure means of extinguishment. The Navy, carrying flammable goods to all parts of the globe and subject to sudden attacks with the inevitable raging fires, had to have aboard its ships a quickly effective fire smothering agent. A tough, heavy foam was accordingly developed. Uncle Sam's boys promptly dubbed it "bean soup" because its manufacturer, National Foam System, Phil-

adelphia, uses soy beans in producing the foam.

Five million gallons of the product went to the armed forces during the war. The U. S. Coast Guard, following its part in the development and use of the foam, has recently approved its use on the American merchant fleet. As a final step, stocks of the product were released to industry in general, to help cut down some of the $450,000,000 annual loss in American property and commodities due to fire.

Concentrate Used

The foam liquid used is a concentrate and only about six gallons are required to make one hundred gallons of the solution from which the foam is made. And the foam produced is about ten times the amount of solution used.

In testing the material, it was proven that a large volume of foam per gallon of solution was not desirable. It was found that an adhesive foam, tough and heavy, one which will not break down in the presence of heat, nor be dissipated by wind or heat drafts, will extinguish more fire than a light, fluffy, voluminous substance. The one finally developed was long lasting and covered highly volatile liquids exposed to fire with a stable, gas-tight blanket. It surrounded obstacles and adhered to vertical surfaces.

Fresh or Salt Water

Usable with either fresh or salt water, the usual packaging of the foam liquid is in five-gallon containers weighing 52¼ pounds and having a grip handle for convenient handling. Nozzles used operate at pressures as low as 30 pounds.

Fire-fighting schools, such as those maintained at Navy bases, have turned out many efficient "smoke-eaters" and their work is in the now-it-can-be-told class at present. In the accompanying photos, which were made with Navy approval at the Brooklyn Navy Yard to show business and industry how the fleet learned to successfully fight fire, the pressure at the nozzles is 125 pounds per square inch and 532 gallons of water and foam are being discharged per minute. One to one and a half minutes were required to extinguish most of the fires with the foam.

EXPOSED TO *Dryer-itis?*

You won't find "dryer-itis" in the dictionary but according to our book it adds oven production costs which can be prevented.

DRYER-ITIS is a costly industrial fire "rash" which can break out with terrific suddenness in and around drying ovens unsprinklered for fire protection. The absence of open flame as in steam-heated ovens has been mistakenly interpreted by plant safety men to mean the absence of a fire hazard as well. Yet several disastrous fires of this nature have occurred lately to dispel such false security—the fires starting in the contents of the unsprinklered dryers and extending into adjacent areas with serious and expensive interruption to production.

One of the most recent of such fires involved synthetic-rubber-coated materials drying in an unsprinklered steam-heated oven. The Factory Mutual Record reports:

"The cause is not known but probably some of the festooned fabric slipped from the supporting rods, piled up on steam heating pipes, and eventually ignited. An employee

who discovered smoke coming out of the oven opened the door to investigate but was driven away by a blast of flame. Heat billowed out and a number of room sprinklers near the dryer operated, but the sprinkler water could not reach the blazing oven interior."

Despite the excellent and timely salvage work in the plant, actual losses still amounted to about $25,000, a substantial figure to pay for someone's error in sprinklering judgment.

Employees were prevented from attacking the fire with extinguishers by the exceedingly dense smoke which similarly stymied the fire department. Firemen required two hours to extinguish the blaze and were forced to lay four hose lines for both solid streams and spray nozzles. A total of 1200 yards of goods in the oven were destroyed with it, but that was not all. Smoke and dirty water

stained a large stock of finished raincoats as well as damaging thousands of yards of fabric, several tons of resin, cornstarch and soapstone.

From the production standpoint, the report goes on to itemize the countless cleaning-up jobs, drying, rehandling, inspecting, resorting and repacking of both finished and raw materials in the area made necessary by the fire. The oven was totally lost to production, motors located in pits were flooded beyond use and caused power shut-downs on two calenders for three days.

The answer to this costly problem of fire control—this scourge of dryer-itis—is fairly obvious. Some automatic sprinkler control of the oven interiors is definitely indicated when either the construction or the contents will burn when ignited.

Recommended Practice

In By-Products and Benzol Plants

By R. W. SCHIRMER
Hendricks Engineering Corporation
Carbondale, Pa.

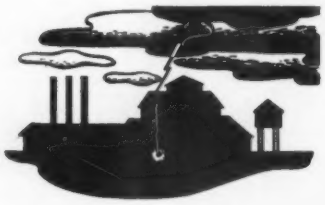
IRON AND STEEL ENGINEER abstract of a paper delivered at the 1946 Iron and Steel Exposition, Cleveland.

By-product and benzol plants are considered extremely hazardous from a fire and safety to life standpoint. Past experience and loss records prove the accuracy of this statement. Methods of safe installation and operational practices present a serious problem as well as do the effective means of combating and extinguishing any possible fires occurring in these plants. The subject should therefore be approached from the following angles:

A. Proper, safe installation of all equipment with all possible precautions being taken for the prevention of fires.
B. Inauguration of all known safe practices in operations so as not to defeat the purpose of preventive measures incorporated in the construction of the plant and equipment.
C. Provision of adequate fire fighting equipment of the type suitable for hazards involved and the maintenance of an efficient properly trained private fire fighting brigade within the plant.

The following further suggestions should be considered in constructing a new plant and incorporating the best known fire prevention and safety measures and practices in that plant. The application of these measures in existing plants will naturally be tempered by actual physical conditions and availability of funds necessary for making the changes required.

1. Proper safe installation of all equipment with all possible precautions being taken for the prevention of fires.
2. Plants should not be located in congested areas, and adequate area should be provided within plant to allow reasonable safe distance between buildings, scrubbers, agitators, tanks, loading racks, etc.
3. Buildings, equipment, tanks, etc., should all be properly grounded.



4. Railroad tracks entering plant area should be insulated from tracks outside of plant area and all tracks inside plant area should be properly bonded and grounded.
5. All lighting inside of buildings should be of the approved explosion proof type, all lighting outside of building should be of the approved vapor type.
6. Storage tanks should be enclosed in diked areas, tanks to be separated by individual dikes depending upon capacity and classification of liquid stored in tank.

7. Tanks should be properly vented with protected vents of proper size.
8. No open pipe trenches should be permitted, piping should be overhead or buried. All pipe connections to tanks should be at top of tanks where possible.
9. Inauguration of all known safe practices in operations so as not to defeat the purpose of preventive measures incorporated in the construction of the plant and equipment.
10. Carrying of matches or smoking material inside plant area should be prohibited. Smoking should be prohibited.

11. Rigid rules for grounding portable equipment, tank cars, etc., should be enforced.
12. Non-sparking type tools only should be used.

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- Safe for foot or wheel
- Carries the heaviest of loads
- Lasts for years and years
- Cleans easily, drains freely
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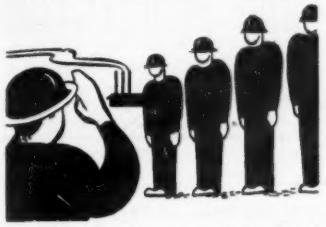
Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

13. All vents on tanks should be examined weekly for signs of corrosion and necessary repairs or replacements made immediately.
14. Coal fired locomotives should not be permitted.
15. Excellent housekeeping practices should be enforced.
16. Provision of adequate fire fighting equipment of the type suitable for hazards involved and the maintenance of an efficient, properly trained, private fire fighting brigade within the plant.



17. Yard main and hydrant system of adequate size, capacity and pressure should be provided, hydrants to be 50 ft. from buildings and spaced at about 400 ft. intervals. Ample supply of well maintained fire hose must be provided.
18. Permanent installed approved foam extinguishing equipment and carbon dioxide equipment should be provided. Water fog may be used.
19. Ample portable first aid foam, carbon dioxide and carbon tetrachloride equipment should be provided.
20. Fire alarm, connected to audible sirens and to plant protection office, should be installed. Private fire brigade, properly instructed and drilled at monthly intervals, under supervision of a competent Plant Fire Marshal, should be maintained. Definite specific instructions as to calling public fire department should be posted and should be clearly understood by all members of brigade and protecting officers.

Simple Test Detects Carbon Tet Vapors . . . A simple test for determining the presence of dangerous carbon tetrachloride vapors in air has been developed by the Research Laboratory of American Optical Company. In view of its simplicity and speed the test may prove useful in some industrial plants and laboratories where a quick, rough check on the purity of air is desirable.

Required apparatus includes an alcohol lamp and approximately six or eight inches of ordinary bell wire or other untinned copper wire about the diameter of a pencil lead, one end of which is stripped clean of insulation and formed into a spring-like coil about one-half inch long and approximately one-quarter inch in diameter. Testing consists of inserting the coil of copper wire into the base of the flame of the alcohol lamp and the upper part of the flame noted. In the presence of carbon tet in a concentration in air exceeding five parts per million, a slight but unmistakable green color is imparted to the flame. In the absence of carbon tet, no green color is seen. If certain other undesirable volatile chloride compounds are present, the test may show the green coloration also.

The test procedure described should not be considered a substitute for highly accurate quantitative tests conducted by an experienced laboratory technician and precautions should be taken to use the test where explosive vapors are not present.

WHY GAMBLE
WITH
FIRE and EXPLOSION
WHEN SAFETY MAY BE FREE

Check with your insurance counsel. You may find it possible to secure your property against *fire* and *explosion* hazards of flammable liquids . . . and gain a reduction in premiums too!

Don't gamble with your property—your business future—or peoples' lives when it's so easy to be safe.

Hundreds of super-safe products specially designed and approved for the prevention of fire are built by PROTECTOSEAL who pioneered safety in handling flammable liquids... PROTECTOSEAL products are commended by safety experts everywhere.

SAFETY CAN
Store and pour—safe and sure
U. L. and F. M. approved

Symbol of Safety
Identifies Protectoseal—
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FILE YOUR NAME NOW—Be sure you get free copy of 24 page booklet on Protection.

THE PROTECTOSEAL COMPANY
1970 S. WESTERN AVE., CHICAGO 8, ILLINOIS

The 3 E's of Fire PREVENTION and PROTECTION

ENGINEERING • EDUCATION • ENFORCEMENT

By WILLIAM F. O'CONNER
Professor of Safety Engineering
New York University

PART IV

THERE have been developed several methods of impregnating wood and fabrics with fire retarding chemicals. Most of these developments are not too permanent, and the desirable property is only temporary. Some of the processes themselves are extremely hazardous. However, we should look for much progress along these lines in the future. It will be a happy day when paper, fabrics, textiles and materials of construction can all be rendered fire-resistant.

We have all witnessed the phenomenal success of the DDT type insecticide. New reports concerning its effectiveness on various species are being published almost daily, and last summer probably witnessed its first domestic use on a large scale. Most of the solutions of DDT are made up from a petroleum base and then sprayed on the surface of various objects.

The handling and spraying of this material constitutes a fire hazard somewhat similar to that involved in spraying lacquers and the customary precautions will have to be observed.

During the war, we built up an enormous production capacity for light metals and their alloys. Most notable of which are magnesium and the magnesium alloys. These constitute a grave fire hazard from the very beginning of production and follow it all the way through to final fabrication. As these alloys are about one-half as heavy as iron and steel the weight advantage is obvious. We have the hazard from overheating while machining magnesium, ignition of the scraps, shavings and filings, but in the finished form there is very little fire danger unless the products are involved in a spreading fire, then we definitely have fireworks.

As more and more furniture is being made from the light magnesium alloys for use in the home and the office, fire-fighters must be careful in applying water should a fire break out. Many automotive parts and motor castings will be made of this material and here again, we will be confronted with this potential hazard.

Recent tests show that sprinklers are very effective in controlling the magnesium type of fire. Of course, it is almost impossible to put a magnesium fire out with water, but the water is able to prevent the spread of fire to adjacent quantities of magnesium if applied soon enough, and in sufficient quantity.

Powder Hazards

Many new alloys, hitherto thought impossible, have been produced by the powder metallurgy technique which consists in the grinding of pure metals exceedingly fine, blend-

This silhouetted night shot of Philadelphia firemen fighting a five-alarm blaze in an empty warehouse tells a graphic story of how industrialists in a big city must consider unused buildings as potential dynamite to the fire security of adjacent industries. Sparks from this fire showered over a fifty-block area, starting innumerable small fires, and heat explosions rocked surrounding foundations, causing collapse seven minutes after the fire started.

ing these metal powders in proper proportion and then sintering or fusing them to the desired properties such as a hard surface, porous body or reflecting surface.

The alloys that have been produced with this technique are better, more uniform and often cheaper than conventional methods. The hazard here is that these powder materials are in such a fine state of dispersion, that unless proper control is exercised they form an explosive mixture with air. Some powders such as copper, chromium and lead, have a very low order of flammability and explosibility, while others, such as zirconium, magnesium and aluminum, are much more hazardous. Several plants have been wrecked completely as a result of permitting these metal dusts to accumulate.

Costly Door Slam

We are all probably familiar with the plant making aluminum powder that exploded when some one slammed the door. The slamming dislodged some accumulated aluminum dust from the rafters, it formed an explosive mixture with the air. At the same time some one turned on the light switch, the arc from the switch ignited the mixture and wrecked the plant with the loss of 6 lives.

Some of the new ideas which are being investigated to cut down the fire risk are the development of surface coatings for light metals and alloys to make them more resistant to fire so that it will be difficult to ignite them. We should soon see the development of better fire retardant chemicals and better processes to render paper, textiles and building materials more resistant to fire. We will witness quite a development in new powder chemicals for fire extinguishing agents, a field which I believe has only been scratched. Paralleling this will be the development of new and better fire extinguishing liquids and better methods of utilizing them in fire fighting.

The field of new surface active agents to lower the surface tension of water, should be explored so that we will actually have a wetter water, which will be much more effective and which will do the job with greater economy

Wetter water would also change the characteristics of water fog and sprays. New nozzles will have to be developed. This new approach would be quite effective in rural areas where water is at a premium.

Electric Aids

The new field of electronics opens up new vistas for research in so far as applications to fire protection are concerned. At the present moment, I cannot name a single instance, save the walkie-talkie and smoke detector where electronics have come to the aid of the fire protection man in either fire prevention, fire detection or fire fighting.

When we consider that many of the great advances in quality control, navigation, gun fire control, industrial instrumentation, radar, and loran have made use of electronics, we should look for quite a few developments in the first protection field.

Look to Public

I think we will see in the next few years a new approach to the responsibility for public liability in the case of fires, and I think this new approach will be able to exert considerable pressure to lower our fire losses from the present fantastic and disgraceful figure of $500,000,000.

The End

Know Your Extinguisher Maintenance . . .

VAPORIZING LIQUID

Test the action by pumping some of the contents into a clean, dry container, and return the discharged liquid. In the case of the pump-gun types, add more liquid, if necessary, to bring the level to within half an inch of the top. In servicing the stored pressure type, bring the liquid to the proper level and replenish the air pressure.

Never recharge a vaporizing liquid extinguisher with ordinary carbon tetrachloride or use water to test operation, as either will cause corrosion. Do not lubricate any part of the extinguisher.

CARBON DIOXIDE

Examine hose and horn for defects and see that the seal on the operating valve is intact. Weigh the unit. If there is a loss of weight, the extinguisher should be recharged. Recharging service is offered by the extinguisher manufacturer or his agents or by carbonic gas plants.

FOAM

As in the case of the soda acid, discharge by inverting. Remove the head and lift out the inner tank. Rinse the extinguisher thoroughly, draining water out through the hose. Dissolve the charging material according to instructions on the packages, using hot water for the A charge and lukewarm water for the B charge.

Pour solution A into the inner cylinder and solution B into the outer tank, bringing both up to the filling marks by adding water. Replace the stopple on the inner tank and return it to the extinguisher shell. Replace the head, as for the soda acid.

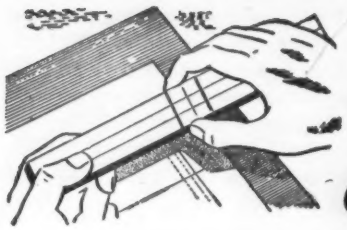
LOADED STREAM and GAS CARTRIDGE

Since these types operate by gas released from a carbon dioxide cartridge, they should not be discharged for the annual servicing. Remove the head and gasket and inspect parts as outlined under the soda acid. Remove the cartridge and weigh on an accurate scale.

A loss of half an ounce or more indicates leakage and a new cartridge should be inserted. If necessary in liquid types, add water to bring the liquid in the tank up to the filling mark. Then replace the head.

PUMP TANK

Test by operating the pump several times, discharging the solution back into the extinguisher tank. A drop of thin lubricating oil may be placed on the piston rod packing. Bring up to the filling mark by adding water, if necessary.



New Products

For further information on any of these products, simply list the key number at the foot of each item on the special post card enclosed with this issue.

LADDER LEVELER—The Akron Steel and Sales, Inc., Akron, O., announces an aluminum truss, called a Shur-Foot Automatic Leveler, for safely leveling a ladder on uneven

ground. A half-circle of steel pipe adjusts the feet laterally and carborundum abrasive shoes on ball and socket joints hold the ladder in place. **NP 88**

OIL-PROOF APRON — A new heavy duty, oil-proof industrial apron made with Ameripol synthetic rubber has been added to its industrial clothing line, it is announced by The B. F. Goodrich Company.

The new apron size is 34 by 47 inches, it weighs 1½ pounds, and is hemmed throughout; fitted with four grommets. **NP 89**

HAND EXTINGUISHERS — An Underwriters-approved, stored-pressure hand extinguisher is announced by Union Stop-Fire Corp., Brooklyn,

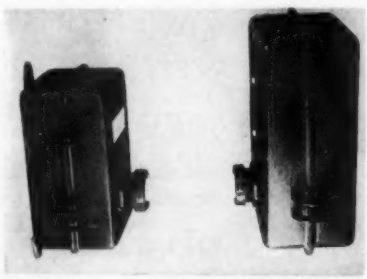
N. Y. The tank suspends on a shoulder sling allowing both hands free for aiming the hose and regulating the pressure on the stream. A flexible hose permits an aim in any direction with a stream range from 15 to 25 feet.

Extinguishing fluid is carbon tet combined with carbon dioxide and is reported effective even on stubborn oil, ether, gasoline or electrical fires, having a blanketing action. Container is brass, non-corrosive, has no moving parts, and is refilled only as used. **NP 90**

LIFETIME AWNINGS — KOOL-VENT is the trade-marked name for a new ventilated aluminum awning that provides safety features not found in old-fashioned types with the economy of "lifetime service." The manufacturer is Koolvent Metal Awning Corp., Pittsburgh.

Made of aluminum with aircraft type riveted construction, KOOL-VENT awnings are fireproof. This feature alone dictates their use on hotels, hospitals, industrial plants, stores, offices, factories and public buildings where large concentrations of people make disastrous fires an ever-present danger. **NP 91**

SMOKE-EYE—One of the latest of photoelectric devices is the Photoswitch Smoke Indicator, Type A20C, a product of Photoswitch, Inc., Cambridge, Mass. Designed for simple,



low-cost installation on opposite sides of heating or power plant flues, the device indicates the density of smoke passing through and signals when this density approaches the values prescribed by municipal smoke ordinances. **NP 92**

NON-SLIP RUBBER GLOVES — "Griptite," a new rough-surface finish which permits a non-slip grip even in liquids, has been developed by the Surety Rubber Co., Carrollton, Ohio, for its Sureseal synthetic rubber gloves. **NP 93**

HEADREST WELDERS' SPECTACLES—A new headrest spectacle known as "L-T-B-50" has just been announced by Jackson Products, Detroit 7, Mich. L.T.B. means low temperature brazing. It is used where complete eye covering is unnecessary. Takes 50 m.m. lense shades No. 5 and No. 6.

All-plastic in design and of featherlight construction, the headrest feature is said to eliminate the discomfort frequently encountered in ordinary spectacles. **NP 94**

FIRE BLANKET—The U. S. Rubber Co. announces a new type fire blanket for industrial plants to be distributed by Benson and Associates, Chicago, Ill. Made of red glass cloth impregnated with synthetic rubber in a size 60 by 80 inches, it is reported to be flameproof, heat resistant, chemical resistant, water resistant, mildew proof, vermin proof, non-shrinkable, non-stretchable and unaffected by heat or cold. **NP 95**

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Easier THAN DRAWIN' SODA THRU A STRAW!

BREATHING with a Scott Demand-Type Respirator is literally just that—simple and comfortable.

The air is there—gentle, refreshing—every time you inhale. No nerve-wearing miniature hurricane in your face from continuous air flow.

Many companies after only a "preview" trial are replacing cannister masks and discarding continuous flow respirators for the ***new*** Scott Demand Respirator because the use of the Scott Demand-Type Respirator accomplishes three important results:

Breathe Freely
in
DUSTY—OBJECTIONABLE
or
HARMFUL ATMOSPHERES

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- DEFINITELY ***INCREASES*** WORKER EFFICIENCY
- DEFINITELY ***DECREASES*** PRODUCTION COSTS

Here's a statement from an actual user, which tells the whole story—

"As comfortable for 8 hours as for 8 minutes"

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Occie Hazz Says:
"There are two ways of reading OCCUPATIONAL HAZARDS MAGAZINE—one way is just hitting the high spots, and the other is 'from kivver to kivver.' I'm a 'kivver' boy, myself: just read what comes naturally, instead of accidentally."

BUT JUST IN CASE YOU WANT TO HIT THE HIGH SPOTS THIS ISSUE— HERE THEY ARE:

LOCKHEED AND REALISM . . . . . this large aircraft plant has found the answer to "built-out" hazards.

TREATING MINOR BURNS . . . . . a fine article on an often neglected but important first aid practice.

POWDERED ALUMINUM AND SILICOSIS . . . . . doctors are viewing powdered aluminum therapy as a treatment method of great promise to Silicotics.

POWER PRESS TIPS . . . . the start of a series of articles on what's new in power press safety.

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Departments . . . . . .

And

THE FIRE PROTECTION FOR INDUSTRY SECTION . . . Just packed with pertinent information how industry can reduce its terrific annual fire loss.

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